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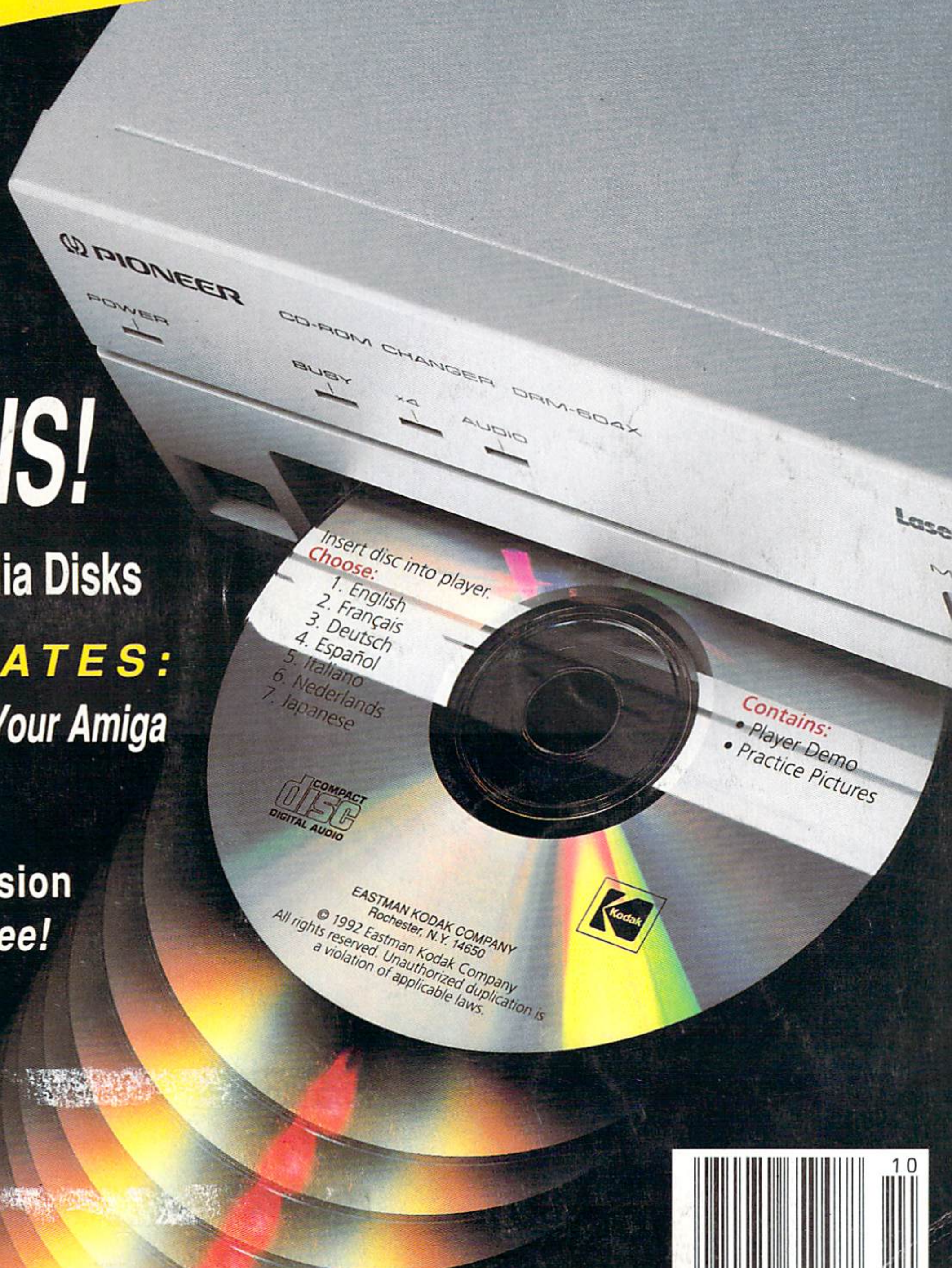
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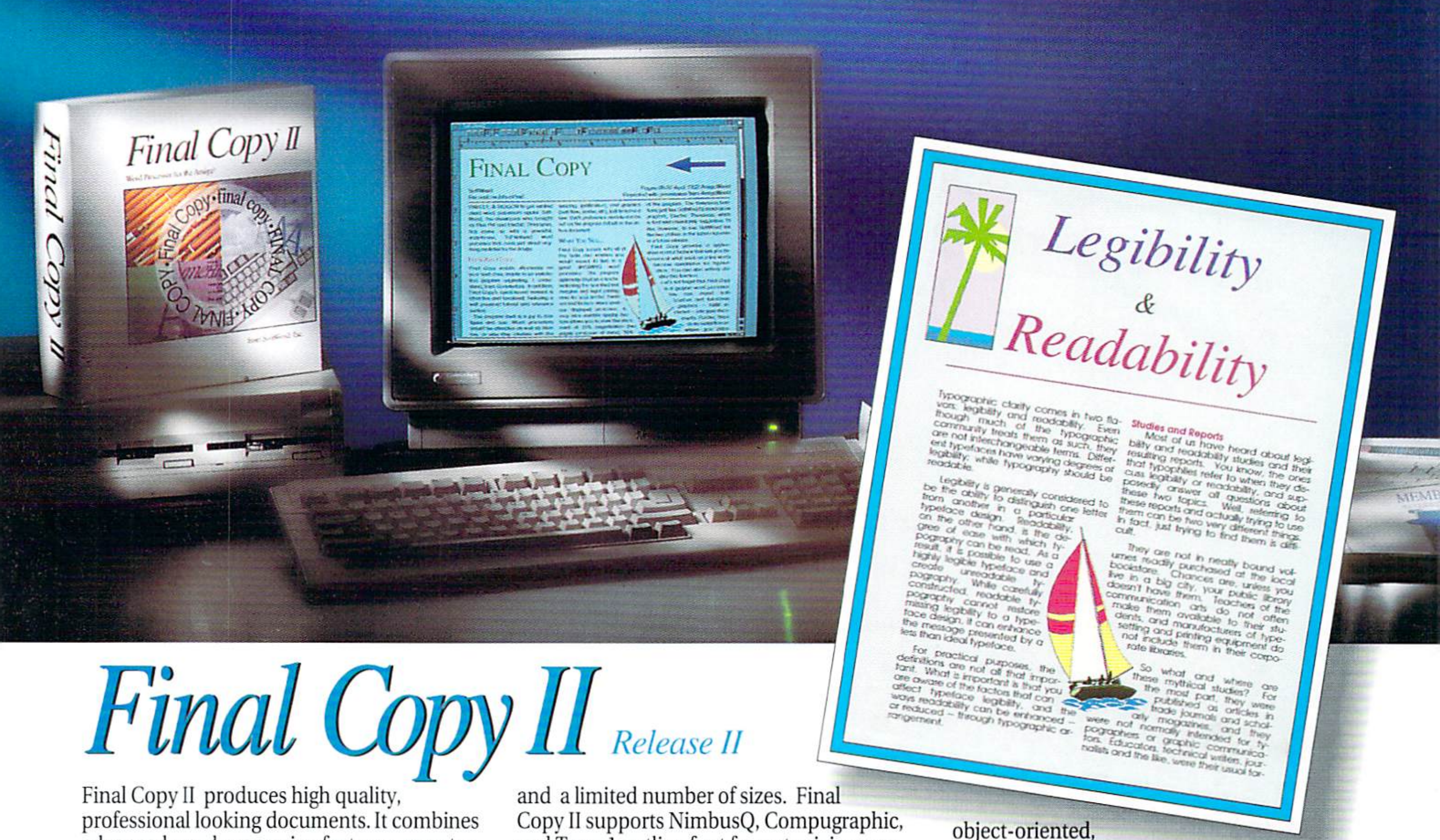


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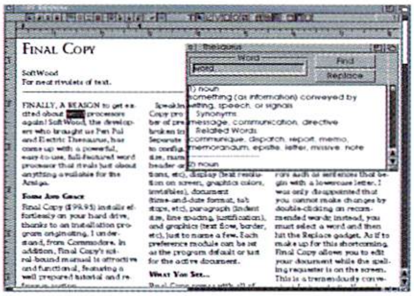
Final Copy II produces high quality, professional looking documents. It combines advanced word processing features, easy-to-use page layout capabilities, and state-of-the-art printing technology into one convenient program.

While other programs claim to have quality printing, Final Copy II is the only word processor on the Amiga that will produce excellent quality printouts on any Workbench (1.3, 2.0 or higher) supported graphic printer. If you have a PostScript printer, Final Copy II is the only word processor on the Amiga that has true WYSIWYG PostScript print capabilities - other programs limit you to a few fonts and a limited number of sizes. Final Copy II supports NimbusQ, Compugraphic, and Type-1 outline font formats giving you access to thousands of commercial and public-domain fonts.

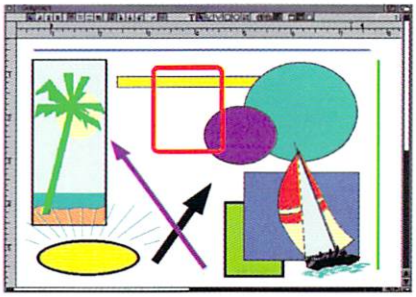
Final Copy II's word processing features include: 144,000 word speller; 1.4 million response thesaurus; automatic hyphenation; named paragraph style sheets; master pages; mail-merge; multiple newspaper style columns; search and replace; header and footer support; left, right, center and decimal tabs; paragraph justification; and automatic date, time, and page number insertion.

Final Copy II's graphic features include: object-oriented, structured tools for drawing boxes, ovals, lines, arrow-tipped lines, and rounded cornered boxes; cropping; graphic sizing; object locking; and graphic depth arranging. Full AGA support lets you work in screens having up to 256 colors.

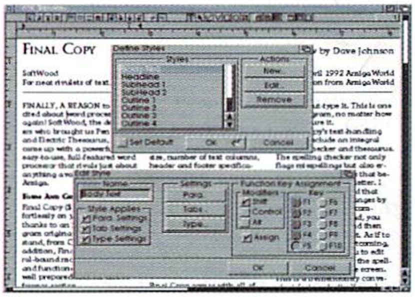
Final Copy II now available in American English, British English, German, French, and French-Canadian versions is the best selling word processor for the Amiga in the world. As stated in a recent AmigaWorld review, "FinalCopy II pulls into the lead of the Amiga word-processing pack."



You want a document that reads well in addition to looking good. Final Copy™ comes with a 144,000 word speller, 1.4 million word thesaurus with definitions, master pages, style sheets, paragraph sorting, math support, mail-merge, automatic hyphenation, and user-defined tab stops to assist you in your writing.



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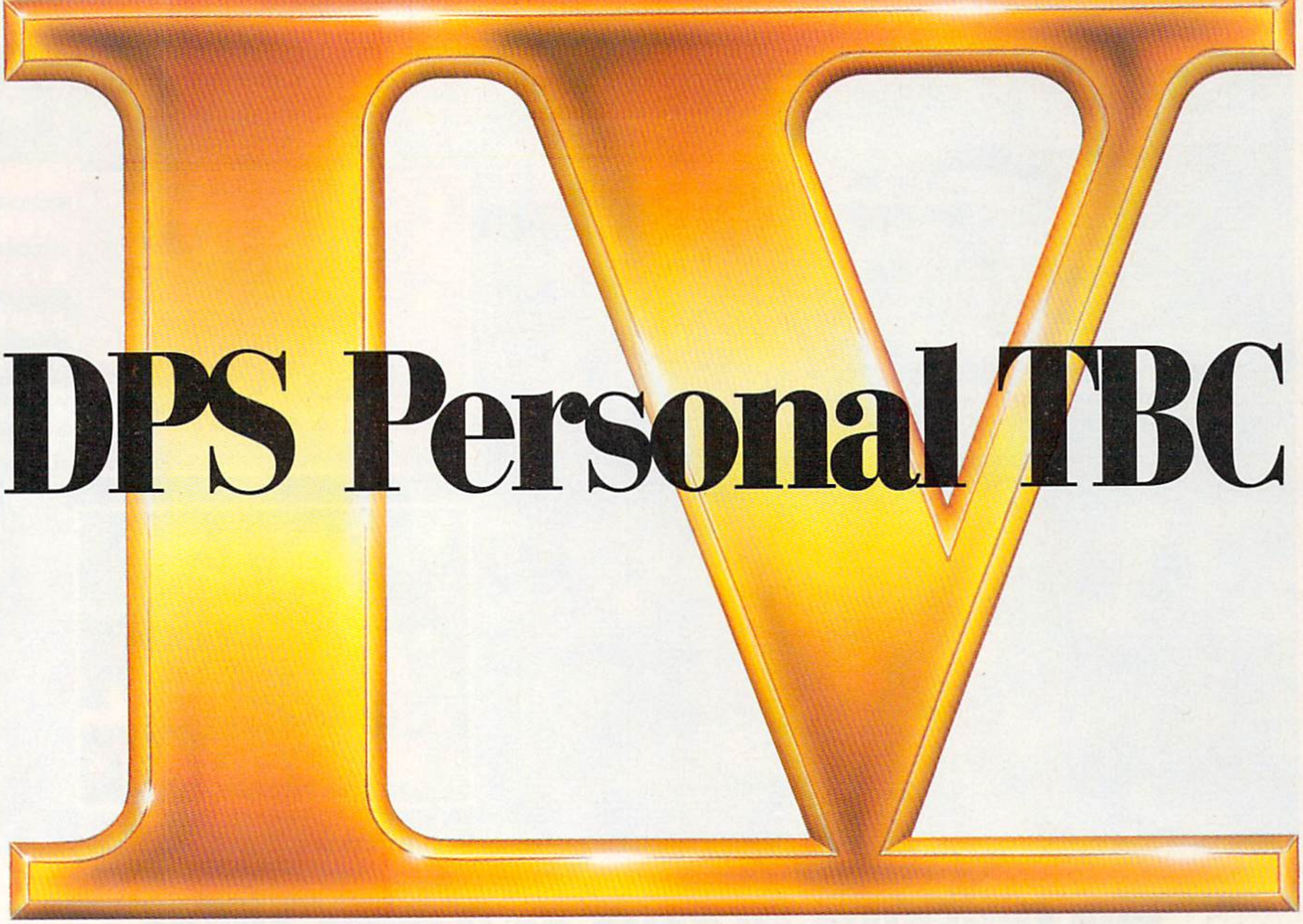


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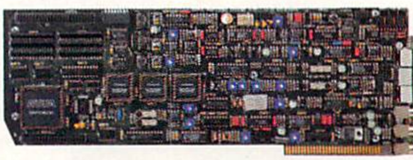
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VOLUME 9, NUMBER 10, OCTOBER 1993



If you've got giga-storage needs, we've got a mega-assortment of devices to keep a lid on your data. From cartridges and tapes to flopticals and opticals through the latest CD-ROM drives, you're bound to find a solution in exactly your size.

FEATURES

ARTICLES

COLUMNS

DEPARTMENTS

REVIEWS

GAMES

COVER PHOTOGRAPH BY EDWARD JUDICE

EDITOR'S DRAWER

Battles are looming in the games market and in the boardroom.

A Light In The Tunnel

Like soggy Midwestern farmlands, the computer industry has been muddied recently with layoff notices and red ink. The fortunes of giant computer companies can swing dramatically overnight, but it's reassuring to know that there are some things you can rely on...as two noteworthy events occurring in Amigadom this month illustrate.

First, Commodore has maintained its commitment to excellence with the introduction of a new game machine called the Amiga CD32. Initially unveiled in London (see report on p. 8), the machine will premiere in the US at the World of Commodore Show in Pasadena and will ship the following month with about 40 software titles available.

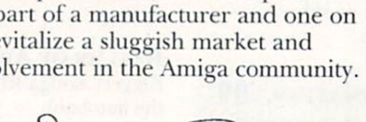
CBM has always been a features-fixated company introducing products that, in many ways, are technologically superior to the competition. This is no exception. Basically an A1200 with a double-speed CD-ROM drive, it features '020 performance with AGA capability, 2MB RAM, and 16-bit CD stereo sound. It includes an 11-button controller uniquely designed for game play and also comes bundled with an as-yet-to-be-determined CD game or games. An MPEG option will let you play 74 minutes of full-screen AGA-quality video and audio.

The impressive features notwithstanding, CBM will need to market aggressively the benefits of this new machine to potential customers. With this product, which is compatible with several video and audio formats—including the new Video CD standard, CDXL, audio CD, and CD+G—consumers have their audio and video needs in one box, along with a great entertainment machine that will also handle their educational and reference needs.

CBM has worked closely with developers in the design of the game machine and feels it has the backing of enough developers to produce 75 titles by year's end. At first, we'll see many ports, since the machine is A1200- and CDTV-compatible. If developers rally behind this machine to take advantage of its outstanding graphics capabilities, we can look forward to some highly polished games featuring interactive full-motion video. (Look for a hands-on review of the unit with more details in an upcoming issue.)

Second, you think that one person can't make a difference? Don't tell that to Mike Levin, a young firebrand who is spearheading a grass-roots movement to shake up the leadership of Commodore. We were first alerted to his efforts through on-line postings and later through a mailing proclaiming that the Commodore Shareholders Movement seeks the ouster—by a shareholders' vote—of current Commodore CEO and Board Chairman Irving Gould. Levin urges Amiga users to purchase Commodore stock, which will enable them to cast a proxy vote at the November meeting.

These two seemingly disparate occurrences represent attempts—one on the part of a manufacturer and one on the part of users—to revitalize a sluggish market and rekindle a spirited involvement in the Amiga community.



Dennis Brisson
Editor-in-Chief

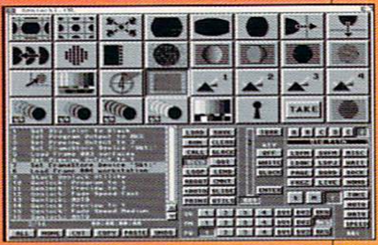
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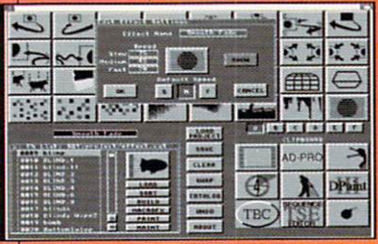
TOASTER TOOLKIT 2.0



Six Power Tools for Power Users! The indispensible collection of utilities for Video Toaster users.

Version 2 of the Toaster Toolkit breaks all barriers for harnessing creative control over your NewTek Toaster Environment--allowing for presentation professionalism powered only by your imagination. You raved about version 1, break free of the mundane with the powertools of Toaster Toolkit 2.0.

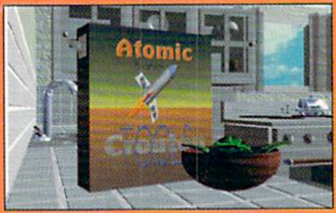
These six powertools in Version 2.0, allow you to create customized effects and much more. **•Toaster Sequence Editor** allows users to sequence all Toaster functions and activate sequences easily from within the Toaster. **•Toaster Project Editor** allows you to create custom Project files, rearrange effects, change effect speeds, delete unwanted effects and add new effects...also create MacroFX to run programs or scripts directly from the Switcher. **•AnimtoFX** allows users to create their own custom animated effects and organic effects easily from DPaint animations. New features include 2, 4, 8, and 16 levels of transparency to help eliminate jaggies. **•FX to ANIM** allows users to modify current Toaster effects. **•Color Font Conversions**, change any full color DPaint graphic for use in ToasterCG. **•FrameStore Compressor** allows you to compress Framestores with no loss of image quality. New features include faster compression and powerful framestore renumbering facility.



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System Requirements: Workbench 2 or higher, Video Toaster 2.0, 7MB or more of memory, 2MB of chip memory helpful. TRexx Professional and/or Toaster Toolkit helpful as well.

Watch for future releases in the Scene Machine program series from Atomic Toaster Catalog and DevWare Video!



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A fast, high quality, powerful morphing system that is easy to learn and use. Includes high end features found in more expensive systems--without the *Rolls Royce* price!

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Toaster Toolkit 2.0 was developed by The Byte Factory. Crouton Tools was developed by Atomic Toaster Catalog. Cocoon was developed by Ironworker Studios.
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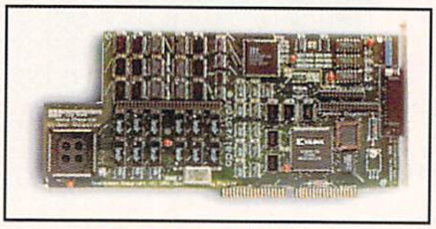
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OpalVision

Seeing is Believing

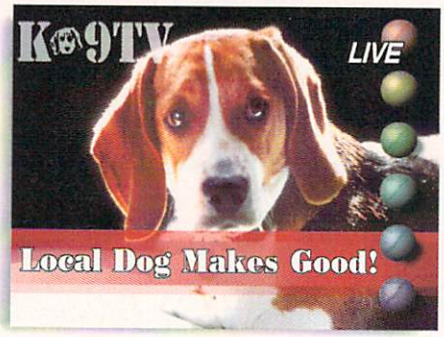
Never before has a system given you all of the necessary tools to create video productions with your own individual style.

Now you can create broadcast quality videos with unmatched ease, power, and versatility: OpalVision gives you lots of inputs in multiple video formats, both PAL and NTSC. Revolutionary DVEs never before available on a personal computer. Chroma and Luma Keying. Real-time framegrabbing. Full Audio Mixing and Equalization. An advanced character generator. Compatibility with all of the important Amiga video, graphics and animation software.



OpalVision Main Board

The core unit of the modular OpalVision system. A true, RGB, 24-Bit frame buffer, it operates in any Amiga computer with a video slot. It allows smooth fading of pictures, color-cycling effects, and smooth, double-buffered 24-Bit animation. Includes connectors for the Video Processor and Scan-Rate Converter/TBC. Includes *OpalPaint*, *Opal Presents* and *OpalAnimMATE* software.



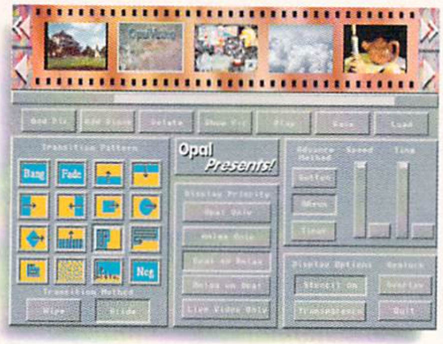
Includes critically-acclaimed *OpalPaint* image processing and painting software. Use the power of OpalPaint to easily create your own images or enhance and modify existing framestores.



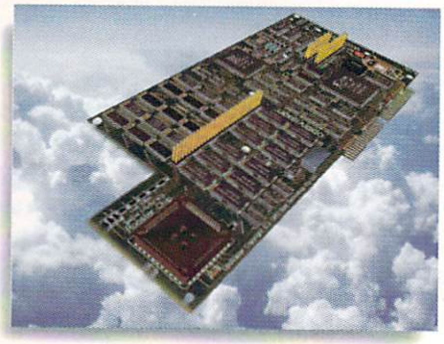
OpalPaint includes an expandable library of image processing modes, texture mapping, color and transparency gradients, multiple work modes, nozzle brushes and many other tools.



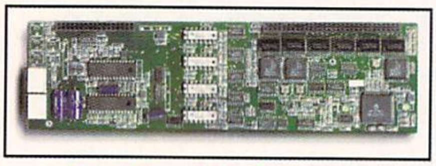
OpalPaint's full range of tools and comprehensive controls provides a level of support for artistic creativity never before available on the Amiga. It's fast. Real-time. Full 24-Bit.



Every Main Board includes *Opal Presents!*, an icon-driven presentation program offering complete display control of OpalVision images, Amiga graphics and live video.

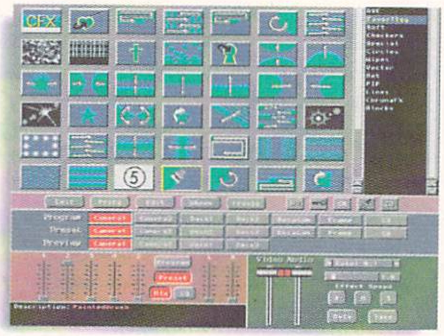


OpalAnimMATE plays animations at rates of up to 60 frames per second. It works in 8, 12, 15, 18 and 24-Bit modes and features selectable screen sizes from 32 x 20 to 768 x 286 pixels.

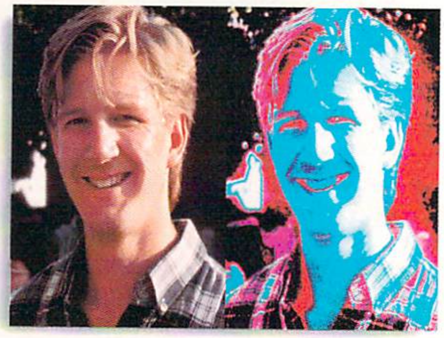


OpalVision Video Processor

Plug this card into the Main Board and add a wealth of additional features: a 24-Bit framegrabber which doesn't require a time base corrector, a professional-quality genlocker with definable chroma and luma keying, a 256-level linear transparency key, a video sandwich key for inserting video into 3D screens, real-time color processing of live video and an unlimited number of transitions and customizable Digital Video Effects using the included OpalVision Roaster Chip and software.



The OpalVision switcher allows easy "drag-and-drop" groupings of icon-based DVE's including ANIM based effects, chroma and luma effects and exclusive OpalVision "Roaster Chip" effects.

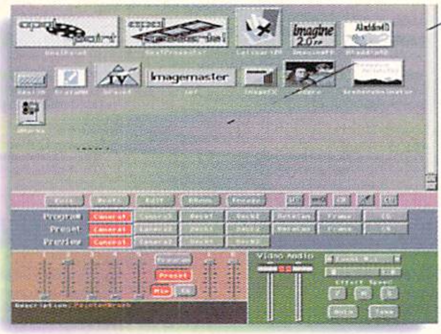


The Video Processor offers real-time color processing of both live video and framestores. Create glows, shines, luminance effects, posterizations, nuclear effects and more.

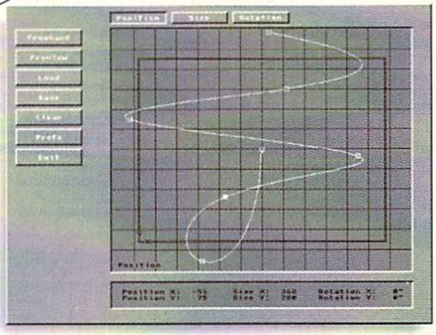


The 256-level linear keyer (Alpha channel and transparency effects) allows the definition of transparency between two video sources on a pixel-by-pixel basis for excellent vignetting and super-smooth shadow effects. The keyer can be taken from the Video Processor or an external video source, and/or output to another production switcher. The Alpha channel also gives you the ability to create highly realistic soft-edged transitions and organic effects. Superb 32-bit graphics with precise and detailed Alpha channel definitions can be created in *OpalPaint*.

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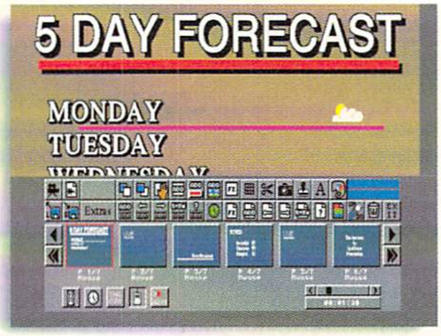
In addition to the wealth of software included with the OpalVision system, you can access a wide array of OpalVision-compatible Amiga software directly from the switcher screen!



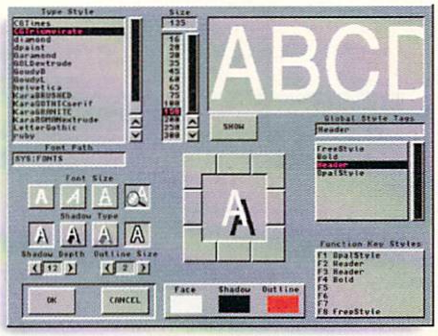
The on-screen editor makes creating your own DVE's fast and easy. Define the position, size and X or Y rotation and the Roaster Chip will transform any video signal at your command.



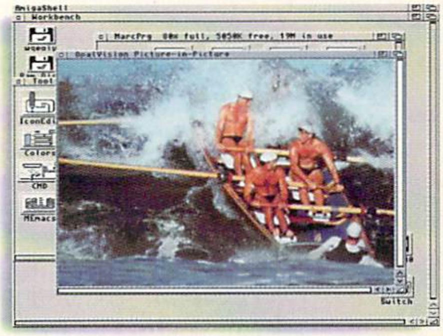
The Video Processor's broadcast-quality genlocker allows both Amiga and OpalVision-generated graphics and animations to be combined with any video source.



The Opal Character Generator offers full 35ns text capability on the A3000 or 4000. Supports Amiga, Compugraphic and Color fonts. CG pages may be incorporated directly into the switcher.



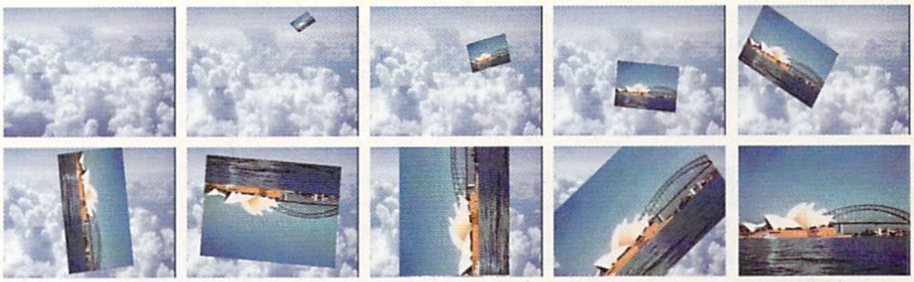
Opal Character Generator features selectable font size, color, outline, drop shadow and anti-aliasing. The CG also creates draggable boxes of text, graphic separators, or IFF brushes and pictures.

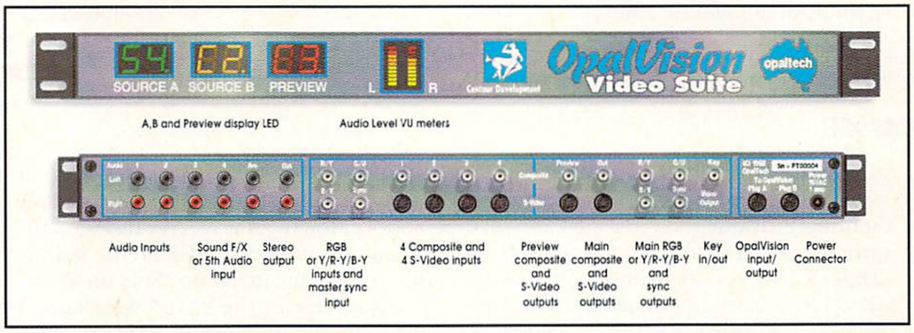


Any video input can be displayed in a draggable, scrollable and resizable window on the Amiga Workbench. Also allows zooming in and out and has AREXX for remote control from other software.

OpalVision Roaster Chip

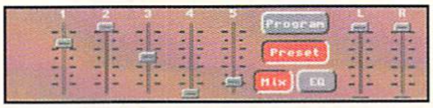
The exclusive technology of the OpalVision Roaster Chip provides an endless number of user-definable Digital Video Effects. Take any two video sources (or an Amiga or OpalVision generated graphic). Flip it . Scale it. Rotate it on the X, Y or Z axis. Move it along a path. Zoom in. Move out. You have complete control. Build your own custom library of useful wipes and effects and give your videos a unique style. OpalVision is the only video system in its price class which gives you this kind of power. You've got to see it to believe it!





OpalVision Video Suite

A 19-inch, rack-mountable, video/audio mixing, switching and transcoding device which connects directly to the Video Processor. Nine video and ten audio inputs are available simultaneously in RGB, Y/R-Y/B-Y, Composite and S-Video. Choose two sources from these inputs, assign a transition or special effect provided by the Video Processor, and trigger it manually or automatically. The linear transparency key provides transparency control between video sources on a pixel-by-pixel basis. The ten audio inputs (five stereo pairs) are fully software-sequenced with smooth fades and full, 5-band frequency equalization.



The automated audio mixer (shown here in a detail from the switcher control panel) features full audio-follows-video capability, plus an on-screen panel with sliders for each of the five stereo audio inputs available on the Video Suite. Sliders control volume and/or 5-band EQ.

OpalVision Scan-Rate Converter/TBC

Add this card and achieve 31Khz, non-interlaced output of Amiga and OpalVision graphics and any incoming video source in either PAL or NTSC. Includes full time-base correction of incoming video. The on-board memory also serves as an additional frame-store.

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OVERSCAN

News, New Products and Networks

Commodore Launches CD32

LONDON, ENGLAND—After months of speculation, Commodore finally announced its newest Amiga—a console machine with 32-bit graphics—to British press and retailers. The **Amiga CD32** promises to be the world's first 32-bit home multimedia console: It should be on UK dealer's shelves by the time you read this (US buyers will have to wait until fall).

The CD32 (about $450) is basically a keyboardless Amiga 1200; it has 2MB of chip RAM and a 14 MHz 68EC020 processor. The machine features a double-speed CD-ROM drive, however, instead of a floppy drive (AmigaDOS is in ROM, with enhancements allowing CD-ROM use). The machine has a hand-held, 11-button game controller with connectors for mice, joysticks, an optional keyboard, a TV set/composite monitor, and video expansion. And finally, CD32's custom chip set has been modified to allow faster hardware-based pixel manipulation.

The new unit is compatible with CDTV and CBM's A590 drive. With the addition of an MPEG-standard **full-motion video card** (shown in prototype form, and due to sell for about $300), the CD32 will play VideoCD industry-standard discs.



CBM's Amiga CD32: the first 32-bit console machine.

Software developers attending the launch were enthusiastic for the new machine, and Commodore expects more than 70 titles to be available by Christmas. Programmers seemed determined to take full advantage of the CD32's mass storage and graphic capabilities. Still, the first releases will be standard-Amiga game conversions. They include **James Pond II *(Millenium), 21st Century Entertainment's* RoboCod** and **Pinball Fantasies,** and **Nick Faldo's Golf** *(GrandSlam)*; all feature CD soundtracks, freeing up the Amiga's four sound channels for in-game effects. Other games are being custom-developed for the machine's capabilities, including ***Psygnosis'* Microcosm** (a shoot-'em-up with over 44,000 frames of animation) and ***Millenium's*** cutesy strategy game, **Diggers**. With a concept similar to Rockford and Lemmings, Diggers shows off the advantages of mass storage with over a million screens on 34 levels.

Even with all this games development, Commodore will be looking to market the machine as a multiuse box, citing video games as only part of the story.

High Power, High Hopes

Unlike cartridge-based rivals such as Sega and Nintendo, Commodore does not have official licenses that can curtail development. David Pleasance, Joint Managing Director of Commodore UK, said that the CD32 is "destined to be the most significant product that Commodore has ever produced."

Ironically, Pleasance's statement is also reflective of the current market: Amiga sales are dwindling and consoles are rising steadi- ►

NewTek Unveils The Screamer

ANAHEIM, CALIFORNIA—SIGGRAPH, the prominent computer-graphics show, once again lived up to its billing this year. There was big news for Amigans who held invitations to a ***NewTek*** reception midway through the event with promises of a "significant hardware upgrade" to the Video Toaster. More than 1500 people attended the NewTek extravaganza hosted at the Movieland Wax Museum.

To get the event underway, Wil Wheaton of Star Trek the Next Generation fame and now bearing the title "Full-time employee of NewTek," reintroduced those in attendence to the Video Toaster 4000. The next hour and a half featured NewTekians Tim Jennison and Paul Montgomery busily presenting introductions to a slew of video animations. These included a short by Dale K. Meyer, two music videos by Todd Rundgren, segments from the new Warner Brothers TV series *Babylon 5*, and the opening to Steven Spielberg's new *SeaQuest* television series. Naturally, all were embodied beautiful LightWave animation. Finally, the screen flashed such phrases as "**The Screamer**, 600 MIPS," and "Two times the speed of a Cray Super Computer," as the product was unveiled. (RS# 110.)

There, in all its glory, sat a beige-and-red box resembling a standard desktop computer tower. Best described as a super-accelerated hardware rendering platform for LightWave 3D, the Screamer, said Montgomery, will be the definitive rendering machine. Specifications heard earlier in the crowd were stated officially: "Four parallel RISC processors... 150 MIPS each... priced under $10,000... available later this year." Two hours of anticipation quickly concluded with three minutes of vague generalizations.

NewTek has teased the Amiga community in the past and, yes, it was worth the wait. Let's hope this teaser leads to an equally impressive result.

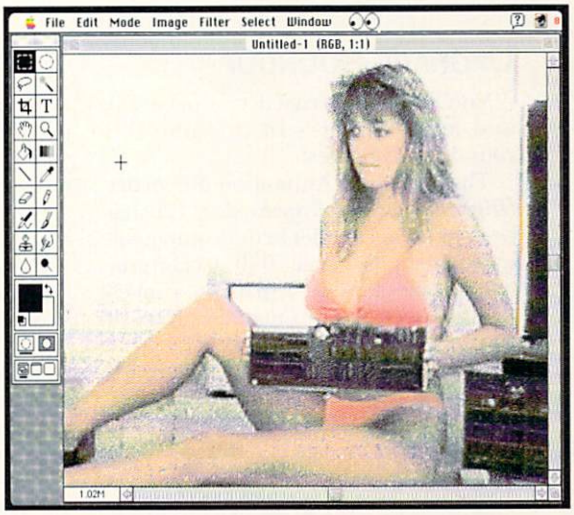
—Steven Blaize

To locate the vendors of products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 90.

The World's First Multi-Platform Emulation System!

EMPLANT™

EMPLANT is a hardware/software product that is designed to allow the emulation of virtually any computer using the Amiga. A simple software driver and ROM(s) from the computer to be emulated are all that is required! Custom programmable logic allows the EMPLANT hardware to actually become the exact hardware of the computer it is emulating. Multiple emulation modules can be run at the same time using a single EMPLANT board!



EMPLANT running *Adobe Photoshop* in full color!

Full color MAC IIx emulation!

Support for up to 16 colors is provided for non-AGA machines. A4000 owners can use a full 256 colors! Support for the Retina Video board allows you to have a **16 million color** Macintosh! Utilities Unlimited,Inc. is working closely with other video board manufacturers to provide support for their video products, such as: The Resolver, Firecracker, EGS, Domino, Rainbow II/III, Merlin and many more! Support for AMAX formatted floppys and hard drive partitions, MAC hard drives, SyQuest cartridges, AmigaDOS devices (RAD, VD0, DH0, etc.), and MAC floppys (requires SYBIL hardware, sold seperately) is provided with easy to use setup menus.

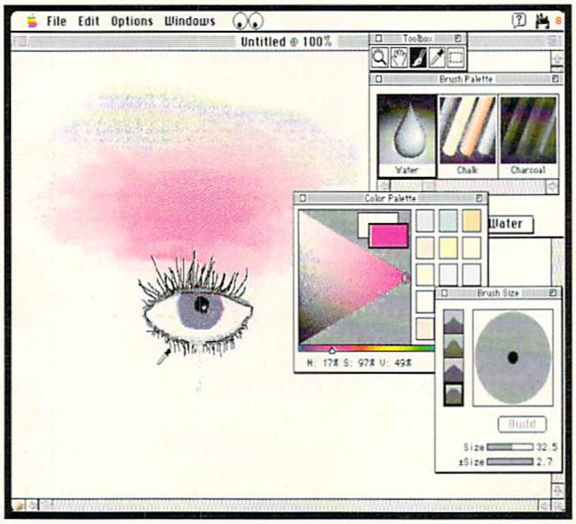
They said it could never be done ...

Like ALL of the emulation modules that will be released for use with the EMPLANT hardware, the MAC IIx emulation module **MULTITASKS** with the Amiga's operating system! You can simply pull down or flip screens and get back to the Amiga side! ...and the MAC stays running at full speed! Speaking of speed...A 25Mhz A3000 runs the MAC IIx emulation exactly twice as fast as a real MAC IIx! Just imagine the speed of an '040 Amiga! The emulation runs ALL known MAC programs, and in FULL color, (if the program supports color)...and all while **MULTITASKING** with the Amiga!! (MAC IIx emulation module *requires* an accelerated Amiga - 68020 or 68030/68040 w/MMU) and 256K MAC ROMs (not provided). Not all emulation modules will require accelerated machines. Four megabytes of memory is recommended for use with System 7.

Future emulations...

Since the EMPLANT's hardware is so versatile, a completely new and different computer can be emulated by just changing the emulation software patch and the ROM(s). MAC QUADRA, Mega ST, IBM AT (386/486), C64/128, Atari 400/800, and even game machine (Genesis/SNES) emulators are planned in the near future.

Utilities Unlimited, Inc, offers four different EMPLANT versions: BASIC EMPLANT system, OPTION 'A' - BASIC EMPLANT system with dual high speed serial ports/AppleTalk support, OPTION 'B' - BASIC EMPLANT system with high speed SCSI interface, and DELUXE - BASIC EMPLANT system with both dual high speed serial ports/AppleTalk support AND high speed SCSI interface.



EMPLANT running *Fractal Painter* in full color!

BASIC EMPLANT system - $279.95
OPTION 'A' EMPLANT system - $349.95
OPTION 'B' EMPLANT system - $349.95
DELUXE EMPLANT - $399.95
SYBIL Hardware - $99.95

Please add $10.00 for shipping and handling (all orders are shipped via UPS Blue label). C.O.D. Fee - $5.00.
All EMPLANT packages described above come with MAC IIx emulation software and necessary device drivers. ROM(s) are not shipped with this product. Sources available upon request. Dealer inquiries welcome! Foreign dealers welcome!

Utilities Unlimited, Inc.

1641McCulloch Blvd. Suite #25-124
Lake Havasu City, AZ 86403
(602) 680-9004 Orders only (602) 453-6407 FAX
(602) 690-9006 Tech calls (602) 453-9767 BBS

ly in popularity. At the very least, Commodore's timing is right; as recently as June, Sega told the British press that it could not produce a 32-bit machine at the right price. Certainly, the CD32's powerful graphics will give 16-bit consoles a run for the money. Expectations are high for the success of the CD32...so let the games begin!

—*Stuart Menges*

Upgrade Roundup

You'll find increased compatibility and more features in this month's roundup of updates.

The **Personal Animation Recorder** (*Digital Processing Systems*, RS# 120) has been modified to offer better compatibility with the G-Force '040 accelerator (Great Valley Products), thanks to joint efforts between the two manufacturers. If you are experiencing compatibility problems, call DPS's tech support at 606/371-5533. Although GVP continues to manufacture the 33 MHz '040 G-Force and 40 MHz Combo for the A2000, it will no longer produce the 25 MHz and 50 MHz '030 Combo accelerators for the A2000.

Version 1.3 of the Superbase line (*Oxxi*) offers better support, more features, and a new name: SBase. **SBase Professional 4 v.1.3** ($299.95) and **SBase Personal 4 v.1.3** ($149.95) support AGA and AmigaDOS 3.0. New additions to both databases include a feature that will recreate indexes and a custom-defined sort order that will allow you to define how to sort scientific or international symbols. Files that were created on previous versions are compatible with SBase. (RS# 135.)

Europress offers not only better features, but faster ones too, with the **AMOS Professional Compiler** (£34.95). The upgrade claims to process programs created with AMOS, Easy AMOS, and AMOS Professional at a much faster rate than the original. The Pro Compiler works on any Amiga with 1MB of RAM; AMOS Pro is recommended. (RS# 136.)

Toaster Toolkit 2.0 ($179.95, *DevWare*) boasts two new utilities for the Video Toaster user: the Color Font Converter (which creates full-color CG fonts from Deluxe Paint) and FTXO Anim (which converts a Toaster effect into an animation that can be edited by DPaint). (RS# 133.)

Now Showing

October is a busy month for Amiga users with three shows touting Amiga wares. Call the numbers provided for more information on workshops and seminars.

Video Expo/Image World
Oct. 4-6
Jacob K. Javits Convention Center
New York, New York
800/800-5474

Gateway Computer Show
Oct. 23
Machinist Hall
Bridgeton, Missouri
314/739-5181

Micro Expo '93
Oct .29-31
Place Bonaventure
Montreal, Quebec
Canada
514/844-0502



ON-LINE SCAN

By Tim Walsh

Check out this month's Reviews section and you'll find two popular options to salvage your hard disk: Quarterback Tools Deluxe and Ami-Back Tools. Actually, there are three if you include Disk Salv 2, Amiga legend Dave Haynie's latest variation on this once freely distributable disk-salvage utility. For the price of a large pizza ($10), you can use the latest version of Disk Salv 2 with a clear conscience. Another $40 yields you a printed manual, scheduled to be on sale around the time you read this.

A tireless soldier in the battle for lost data, Haynie pulled out all the stops with this version (11.27) of Disk Salv. For starters, it now fully supports the Amiga style guide, which may not be such good news to Workbench 1.2 and 1.3 holdouts since it won't work on their machines. There's an all-new graphic interface that lets you cycle through various data-rescue and -recovery operations. You can now undelete files; unformat, validate, or repair disks and devices; and generally undo any damage you or your equipment may inflict on data-storage devices. You also have the option of saving the salvaged data to the device of your choice. While it's not as ornate as its commercial counterparts, it's a lot cheaper and does the job just as well.

One final word of advice, if you keep all of your valuable files on your hard drive, take a moment to copy Disk Salv 2 onto a floppy. That way, if your hard disk dies, at least you can still run the utility to start salvaging your lost data.

Upgraded Utilities

While we're on the subject of disk utilities, SuperDuper by Sebastiano Vigna, the old standby disk copier and formatter, has been recently revamped to version 3.0. Like Disk Salv 2, SuperDuper 3.0 can be found on every net and does not operate under versions of the OS earlier than 2.x With full ARexx support and a button-laden control-panel interface, SuperDuper is easier, faster, and a lot more fun than copying and formatting disks from either the Workbench or Shell. SuperDuper also comes with a program called ToggleClick that stops floppy drives from making clicking sounds. It seems like an afterthought, because drives in newer Amigas don't click and most older ones have utilities in place to keep them quiet, too.

On a completely unrelated note, if you're considering a change of pace in your telecommunication software, consider the newest revision of Term by Olaf Barthel, one of the most fully-featured telecomm packages ever written for the Amiga. Two copies exist—one for 68000/68010 machines, and an optimized version for use with accelerated Amigas. Both packages fall under the heading "version 3.4" and consist of six separate archives. If you're already a Term user, you need only get two archives—the main program file (either the accelerated or non-accelerated copy) and a new set of documentation. New Term users need to download all six archives, which also include fonts, ARexx scripts, translator libraries, and preference settings.

Next month: Watch for a full page of on-line excitement!

BIX
800/695-4882
617/354-4137

CompuServe
614/457-0802
800/848-8199

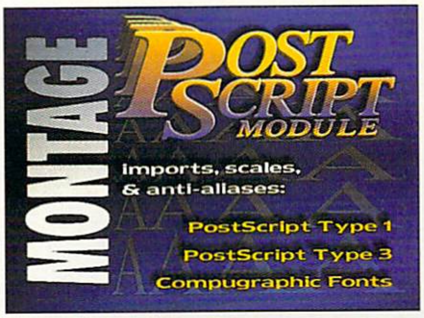
Delphi
800/695-4005

GEnie
800/638-9636

Portal Communications
408/973-9111 □

Title Credits

Give yourself some credit and add network-quality titles and graphics to your video productions with **Montage 24** ($399.95, ***Innovision Technology***), a video-titling package for OpalVision (Centaur), Impact Vision (Great Valley Products), or AGA-machine owners. Even if you can't give your name first-billing, you can give it some eye-catching color with embossing and shadowing effects with Montage 24. You can create backgrounds and import 24-bit IFF and Super Hires HAM-8 images. The software includes eight scalable typefaces, while **Montage Fonts I** ($199.95) offers an additional ten. The optional **Montage PostScript module** ($199.95) offers real-time scaling of PostScript Type 1 and 3, and Compugraphic fonts. Montage 24 requires 8MB fast RAM, 1MB chip RAM, a hard drive with 8MB free, and AmigaDOS 1.3 or later; a 68020 accelerator is recommended. (RS# 134.)



You can generate lots of character with Montage 24.

Join The Club

Join the **Software of the Month Club** and SMC will ship original clip-art and fonts to your doorstep, not once, but twice each month. There are three membership options—SMC TypeWorks, ArtWorks, and DesignWorks—each of which costs $49.95 to join. TypeWorks members receive four fonts twice a month at $19.95 per volume. ArtWorks members receive 48 IFF clip-art images twice a month, also at $19.95 per volume. DesignWorks members enjoy the benefits of both TypeWorks and ArtWorks at reduced cost; they receive 48 images and 4 fonts twice a month at $29.95 per volume. Membership is risk-fee; you can terminate at any time, however, after 30 days neither the membership fee nor the software is refundable. (RS# 121.)

Videographer's Checklist

Shopping for the latest in video tools and accessories? Read on and you'll get a head start on the latest whatzits for video.

Cocoon ($99.95, ***DevWare***) will load any IFF image and render single image wraps and dual or sequential morphs. The morphing software features automatic image scaling, transparent color compositing, and virtual memory. Cocoon requires 3MB (8MB for hi-res morphs) and a hard drive.

Crouton Tools: The Scene Machine Module #1 ($79.95, ***DevWare***) will put your Video Toaster in control of VTRs, paint programs, music, digital audio, morphing programs, and more. It requires Workbench 2.0 or later, Video Toaster 2.0, 7MB of fast RAM, and 2MB of chip RAM; T-Rexx Professional (ASDG) and DevWare's Toaster Toolkit are recommended. Crouton Tools is the first in a series of modules from DevWare; on the way are modules to create storyboards, sequences for rotoscoping, and background music. (RS# 133.)

You can count down to your favorite videos with the **VTClock** (£30, ***Zen Computer Services***), an indent and start clock. The VTClock has six display pages; each can be configured as either a 30-second analog clock with seven lines of indent text on the right-hand side for captions, or as a scratchpad with the text covering the whole width of the screen. The clock can be reset to 10, 15, 20, or 30 seconds and generates a 1 KHz tone between 25 and 20 seconds, followed by a white flash-frame at ten seconds. (RS# 131.)

With one of the EditLink 3300 controllers from ***Future Video*** you can multitask three VTRs. Both the **EditLink 3300** ($1295) and the **EditLink 3300/TC** ($1795) read Sony's Hi8 RC Time Code (RCTC); the EditLink 3300/TC also reads SMPTE/EBU (LTC). The EditLink 3300 series supports VTRs that are fitted with either a Panasonic five-pin, or a Sony control-L/LANC terminal. A controller connects to the Amiga via an RS-232C interface and activates the Video Toaster (NewTek) and other switchers or SEGs via three GPI triggers. Multiple-event A/B roll software is on the way from Future Video. (RS# 132.)

Graphics Grab Bag

Animators, graphic artists, and videographers alike are sure to find something of interest in the latest bag of goodies from ***Activa International*** (RS# 137).

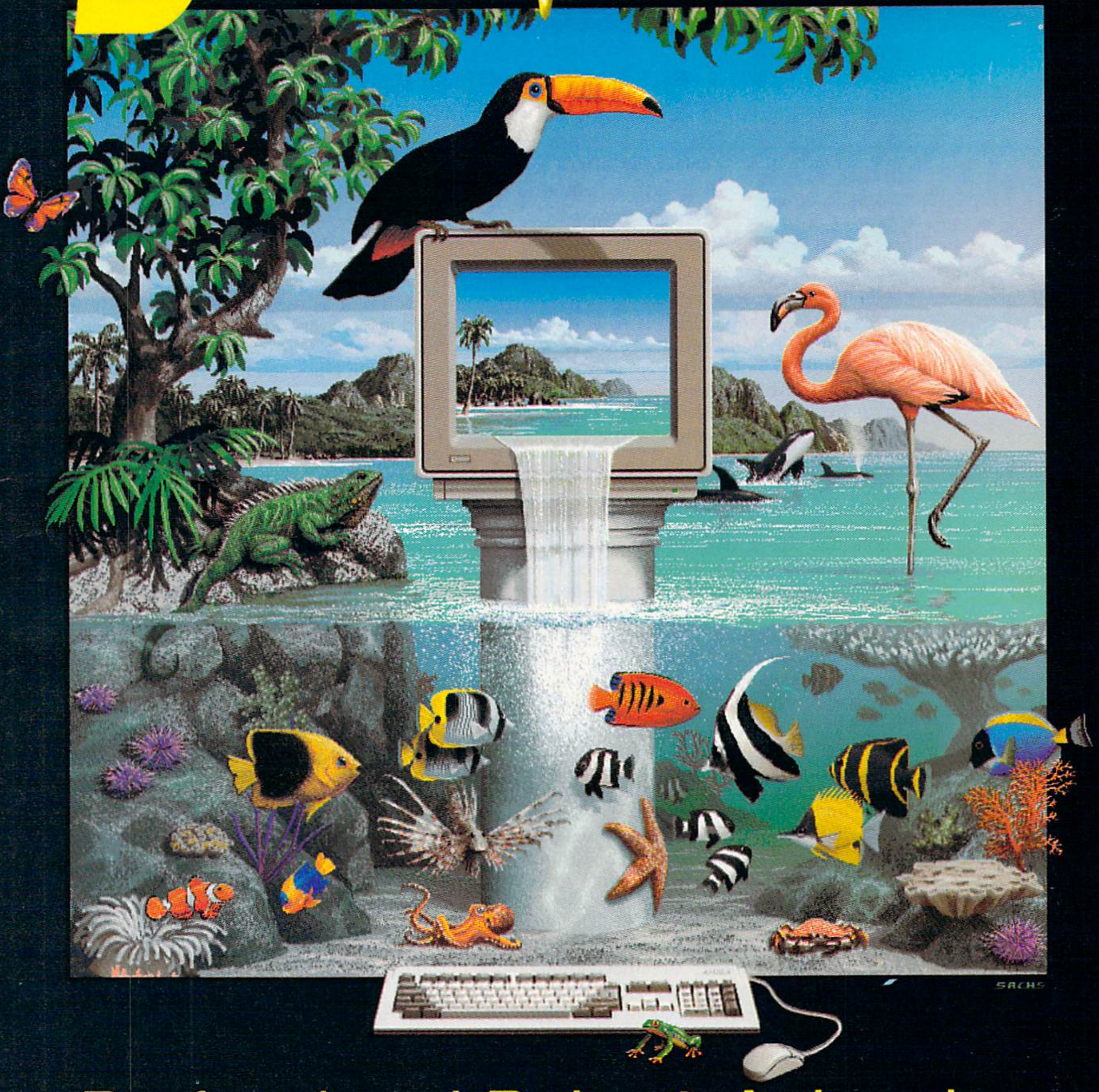
You can improve the display of videos with one of Activa's graphic boards. **Rainbow III** ($2299), **Piccolo** (from $499), and **Rainbow VideoLayer** ($1699) are for Amigas equipped with a Zorro III bus (Piccolo also recognizes Zorro II). Piccolo (distributed by DKB Software) offers 1MB fast VideoRAM (a 2MB configuration is also available) and resolutions from 320 x 200 through 1280 x 1084, while Rainbow III offers 4MB VRAM and resolutions up to 1600 x 1280; VideoLayer offers 768 x 476/238 and 2MB VRAM. VideoLayer can drive several graphic boards simultaneously and features an eight-bit alpha channel. All cards offer the same software, which includes ECS (Enhanced Chip Set) libraries, two paint programs (TVPaint Junior and Painter), DIA (a slide-show program), and drivers for ASDG's ADPro and MorphPlus and Realsoft's Real3D.

If you are a jack-of-all trades, you can create interactive programs with **MediaPoint 3.0** ($499). The multimedia package supports three time codes—standard, MIDI, and SMPTE/EBU—and can control the Video Toaster, 24-bit cards, Studio 16 (SunRize Industries), laser discs, and VCRs. You can copy and paste screen objects and sync audio with pictures and animations. MediaPoint 3.0 requires Kickstart 1.3 or later, 1MB chip RAM (2MB recommended), 1MB fast RAM, and a hard disk.

Why not play your video games from the hard disk? With **Peggy** ($799), an MPEG decoder, the Amiga can read and display 24-bit animation with 352 x 240 resolutions at 30 frames per second from the hard disk or CD-ROM drive at transfer rates of 15MB per second. The optional MPEG encoding software ($499) lets you produce MPEG bitstreams.

PowerFonts ($129) converts Agfa Intellifont scalable fonts into 3-D characters for use in 3-D rendering. You can specify the bevel width and depth, stretch and italicize, or extrude characters. PowerFonts requires AmigaDOS 2.04 or later and Real3D.

User group leaders: Want your organization to appear in *AmigaWorld*'s user group listing? Then send your group's name, plus a contact person's name, address, and phone number to: User group list, c/o *AmigaWorld* Editorial, 80 Elm St., Peterborough, NH 03458. Or fax us: 603/924-4066, attn. User group list, *AmigaWorld* Editorial. ■


SACHS

R E V I E

Single-frame animation recording system; time-base corrector.

Personal Animation Recorder TBC-IV

Digital Processing Systems, $1995 and $999, respectively.

A2000/3000/4000.
Hard-drive installable software.
Not copy-protected.
Accelerator compatible.
2.0/3.0 compatible.
Installation: Are you experienced?
Minimum system: 2MB, WB 2.0, TBC-IV for frame grabbing.

To label Digital Processing Systems' (DPS) Personal Animation Recorder (PAR) as just another animation device is like saying the Video Toaster 4000 is just another video gadget. The PAR is an animation-recording marvel unmatched by any product on other computer platforms, and it could conceivably spell the death of single-frame recording.

As animators will attest, single framing is slow and tedious, not to mention hardware-abusive. As each frame is rendered, the video deck is taken out of standby, the tape is rewound and prerolled, and the frame is then recorded. This process occurs dozens of times, and the associated wear affects both the tape and the heads. That's no way to treat an expensive single-frame-capable deck. Should a dropout occur when you're rendering directly to tape without first saving the individual frames, you must rerender the animation from scratch. The same also holds true for making most frame changes.

Sequence of Events

None of this misery occurs with PAR, which renders your animation directly to its dedicated hard drive. AmigaDOS sees the hard drive as a standard storage device, so you can use existing tape-backup software. PAR's level of seriousness is first apparent in the installation process, which is not easy. There's no way to attach the hard drive directly to the PAR card, so you need to mount an internal hard drive and supply it with power. An understanding of the basics of video termination is also necessary, especially when you need connections to a Toaster and a TBC. These are basic video details, but novices might prefer to let a dealer perform the installation.

To locate the vendors of the products reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 90.

Mounted as device DDR:, the dedicated IDE hard drive saves frames that the supplied software automatically converts into a 24-bit compressed animation. Once you have recorded it to the hard drive, you can play it back in real-time using the VCR-like controls, which include play, stop, rewind, fast forward, frame advance, frame back, slow play and loop. A drag bar along the bottom also allows you to move quickly throughout the animation. A frame counter coupled with a time counter monitors your exact position in the animation.

Editing an existing animation is fast and easy. You can convert an ANIM into its component frames or set a range of frames for conversion. You can rename, move, join, split, append, and delete. Unlike rendering to tape, replacing a frame in a rendered animation takes only seconds. Just split the ANIM at the frame you want to change, delete the offending frame, and append the replacement frame. Lastly, append the rest of the animation. That's all there is to it.

You can also loop an animation a specific number of times and have it play forward, backward, or ping-pong. These effects become a part of the animation rather than just a control over playback. You can adjust playback from a high of 29 to a low of 0.12 frames per second. Be forewarned, however, that the hard drive's compression scheme coupled with the slow-play option can prove unreliable with some animations.

Record Deal

To record to tape, you simply connect the record deck to the PAR's outboard composite, S-VHS, or Betacam/MII connectors. Press a button, use a GPI pulse trigger or an ARexx command, and the animation plays while the deck records. If you do get a dropout or similar flaw on the tape, just

W S

replay the animation and record it again. Nothing could be simpler.

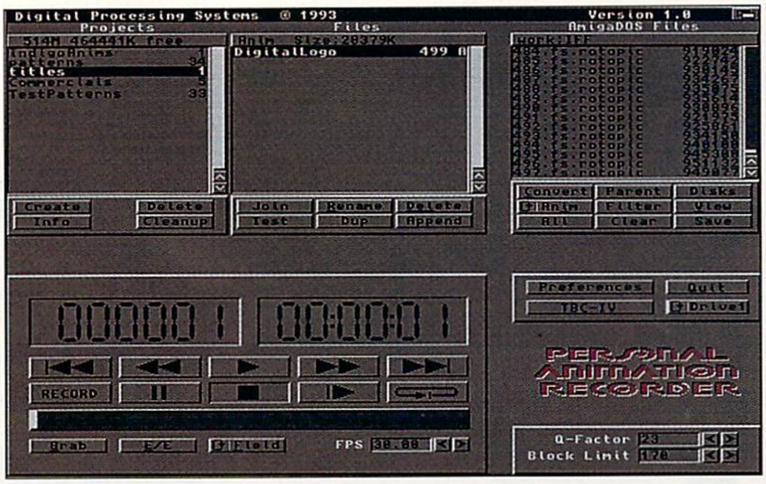
PAR also provides an easy method to preview animations. Traditionally, animators had to single-frame the animation out to a recorder before viewing the results. This typically spelled a long, anxious wait between the creation and the viewing process. Rendering it as a DCTV animation proved to be an alternative, but DCTV (Digital Creations) doesn't always display smooth gradations, and complex animations won't play at their full speed. You suffer the same problem with AGA animations. To their credit, both DCTV and AGA animations give a rough idea of what the finished product will look like, but the PAR lets you see precisely how the animation will appear on tape. For 3-D animators, this means better animations, as frequent viewing and tuning of the results is so much easier.

Similarly, it's easy to convert animations and stills to 24-bit IFF images. Just select the range of frames you want to save in IFF format, choose the directory path to your system's hard drive, and click on the Save option. The process requires about 30 seconds per frame for the conversion.

Unlike real-time JPEG boards that provide instant access to ANIM frames, the PAR is slower and slightly more cumbersome for rotoscoping, but it's a fair trade-off, considering the final quality. Since the conversion process uses the board's resources rather than the Amiga's, you can simultaneously run an image processor to batch-process the incoming images. Using GVP's ImageFX, you could automatically JPEG an image for storage and later manipulation, or compile the frames into a DCTV- or AGA-format animation for distribution. You can configure ImageFX to delete each original 24-bit frame after processing, so you don't have to worry about filling up your hard drive during the conversion.

The ability to play 24-bit animations in 752×480 resolution at a guaranteed 30 frames per second is truly significant. All of the other animation-playback hardware devices for the Mac and PC that I have examined require either a sacrifice in quality or in playback speed. Nothing on the other platforms compares to the consistent quality that the PAR provides.

The PAR proprietary compression scheme is closer to MPEG than JPEG format, but it provides better results than current MPEG implementations, which are limited to VHS quality. When you record to Betacam using the Y R/Y B/Y connectors, you get full digital quality that borders on the incredible. It far surpasses the quality obtained when recording directly from the Video Toaster and its composite output.





The Personal Animation Recorder's user interface makes 24-bit animation creation fast and easy.

Variable Compression

The animation-compressing process begins when you set a block limit that's specific to the hard drive you're using. The latest generation of IDE hard drives offers a faster built-in IDE controller that utilizes a new standard. Seagate employs this new technology with its model 3600A 540MB hard drive. This is currently the only IDE hard-drive model tested and recommended by DPS. It can record from three to five minutes of animation or store up to 10,000 still frames. As other manufacturers adopt this new standard, you can expect DPS to recommend alternative drives.

The next step is to adjust the Q-factor, which determines the compression level. For recording 3-D animations or single frames, you set the Q-factor to maximum compression. As each frame is processed, automatic adjustment of the Q-factor occurs. The more complex the frame, the lower the compression rate, while less complex frames receive a higher compression. This ensures that all animations consistently play at 30 frames per second with no slowdowns or bottlenecks.

Knowing that other boards exhibit discernible ►

differences in quality throughout an animation, we took PAR over the hurdles. This involved throwing everything we could at it, including LightWave (NewTek) animations with camera moves and textures in which every pixel was changing. Regardless, the animations still looked gorgeous, with no image degradation.

Using DPS's all-new time-base corrector, the Personal TBC-IV, to complement the PAR, you can do real-time captures of moving video. The TBC-IV has a special connector that plugs directly into the PAR via a ribbon cable, allowing the two boards to communicate. Instead of using a serial connection, the TBC-IV employs the PAR as its connection to the TBC-IV control software, leaving your serial port free for other uses. Because a TBC is basically a real-time framegrabber, the TBC-IV grabs the video and passes it along to the PAR, where it is compressed into an animation. All of the processing capabilities of the TBC can be used on the video you want to capture.

Finally Free

PAR reduces the amount of time needed for single-framing, leaving videographers more time for creative video recording. When capturing live video, you must adjust the Q-factor manually. DPS provides a suggested minimum setting that works consistently, but you can adjust it upwards for better compression. If you adjust the Q-factor too high (in cases where lots of motion occurs), it won't work, as you cannot then play the video back at full speed. The program would give up, and you would have to lower the Q-factor and try again.

Live video capture offers time-lapse capabilities from 1 to 30,000 seconds per frame; you can also trigger grabs manually using the mouse. Other options from the main control panel let you format and reorganize the dedicated hard drive, and adjust genlock horizontal control and subcarrier. Everything you manipulate from the control panel you can also perform through ARexx. It was easy to incorporate 3-D animations and grab live video into an AmigaVision (Commodore) presentation using a genlock.

I found only one bug in the software. When you attempt to split an ANIM and set the range, canceling the requester does not cancel the operation, but deletes the second half of the animation. Other than that minor flaw, the software is well designed and easy to use.

The PAR saves animators lots of time, and if you currently use an outside studio to record single-frame animations to tape, you'll save considerable money by being able to do your own transfers in minutes.

The Personal Animation Recorder is a high-quality product from a well-respected company. DPS's technical-support people return calls and were generally quite helpful. I can't find any reason why serious animators should not start saving now to buy this package.

—Geoffrey Williams

Charts & Graphs 3.0

***TRSL Software*, $99.95.**

All Amigas.
Hard-drive installable.
Not copy-protected.
Accelerator compatible.
1.3/2.0/3.0 compatible.
Minimum system: 1MB.

Business graphics software.

If you're looking for a well-designed and powerful program to generate sophisticated graphics based on data in spread-

sheet format, Charts & Graphs may be your solution. While most spreadsheets do offer a limited ability to chart the results of data, they mainly focus on data entry and manipulation. Charts & Graphs, assuming that such spade work has been performed, focuses on creating a flexible and appealing presentation of your data.

Great Grids

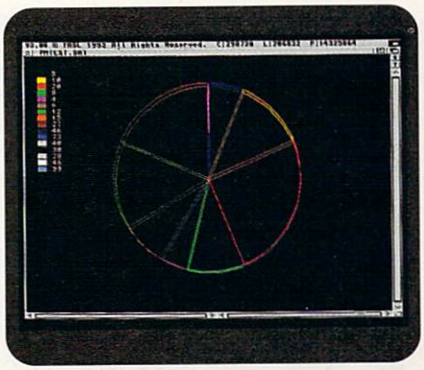
Equipped with a well-written manual that bristles with numerous tutorials and accompanying graphics, Charts & Graphs is a complete chart package. Three comprehensive tutorials guide you through all the basic functions, from entering your data to adjusting axis attributes. You'll find you can generate dozens of variations in presenting your data to suit your audience.

Charts & Graphs allows you to use IFF images and brushes as backdrops and data markers. Need a chart that displays computer sales in the Midwest? If so, use little computers stacked on top of each other and laid over a map of the Great Lakes area. Creating legends requires nothing more than selecting that option from the menu, and picking a font, color, and style, from the requester. Eye-catching and informative text and titles are just as easy to create. Drop your company logo in the corner of each graph to give it a customized touch. And don't fret if you drop it in the wrong place—just grab the offending text, brushes, and legends and drag them anywhere on the chart.

You can position these items freehand, or enable Snap to Grid to lock them in place according to a user-selected grid. This makes it easy to set up straight lines of text or bullet graphics. Either grab the sizing gadget and pull, or select Auto mode and the chart is automatically resized as you size your window. Columns can be either solid or filled with a variety of patterns. The program provides simple paintbox tools, and you can load different palettes for any text, legend, brush, or backdrop, as well as fine-tune your presentation.

Chart Your Progress

Once you create a chart, you can alter it in a variety of ways. A QuickCharts window allows you to easily switch between all the available charts, add text, load palettes, and perform other functions with the click of a button. Making compound charts is also easy. You create your first chart, copy it to the transfer slate, and then go back to the main window and create the second one. Resize the window so you can see the transfer slate, position the new chart wherever you want, and copy it. The transfer slate now contains both charts—and you can add as many more as screen space allows. You can save all charts, whether compound or simple, in Charts & Graphs' own format or as IFF files for ►



Charts & Graphs keeps tabs on your data.

import into paint programs, graphics word processors, and the like.

As with most of the best programs, Charts & Graphs offers full PostScript output support. You can print to a PostScript printer directly from Charts & Graphs just as you would from PageStream, Professional Page, or other PostScript programs. You can export files you create to any program that allows importation of PostScript files—PageStream, for example—and massage them further in that environment.

Wish-Listing

Charts & Graphs seems an ideal candidate for integration with spreadsheets through ARexx, which makes the lack of ARexx support a sore point. The ability to port information directly into Charts & Graphs and automate the basic steps in chart generation would make the program more useful. The lack of support for structured-drawing tools is puzzling as well, as is the program's inability to import and export structured-drawing components and charts. Resolution and aspect would be better maintained than in the IFF bitmap format currently supported, although the IFF format enjoys a wider base of support.

One of the advantages of Charts & Graphs over MaxiPlan 4 (The Disc Co.) is its ability to print charts in landscape mode. Unfortunately, however, you cannot print the raw data in landscape, and sometimes only numbers will do. Remedying this would be a big help for those who design business plans and other number-intensive documents. A simple routine to allow sideways printing would also be welcome.

Blemished Records

No program is flawless, and Charts & Graphs proved no exception to the rule. Getting it to run from the hard drive on my A3000 under OS 2.04 or 2.1 was not entirely effortless. Attempts to open a new window resulted in a console window on the Workbench that informed me it was "Unable to OpenNewWindow." However, when I used my wife's A500 under 1.3 or booted my A3000 from the Workbench 2.1 floppy, all went well.

When I called posing as an end user, technical support at TRSL was responsive and first-rate at addressing my problems. They sent many different versions and spent hours on the phone trying to diagnose the ailments. They eventually developed and sent me version 3.05 of the program, which performs without a hitch on the A3000, so if your 3000 exhibits peculiarities similar to what I experienced, be certain to get 3.05 or later from TRSL.

If your charting needs are modest, you may find the brief array of charts in your spreadsheet or similar business program sufficient. But if you require greater control over the way your data is laid out and want a wider variety of line, column, bar and pie charts, compound charts, backdrops, PostScript output and more, then you need Charts & Graphs.

—Rick Manasa

ScapeMaker

MegageM, $64.95.

All Amigas.
2.0/3.0 compatible.
Hard-drive installable.
Not copy-protected.
Accelerator compatible.
Minimum system: 1MB.
Recommended system: 2MB for large landscapes, 4MB or more to multitask with VistaPro and/or DPaint.

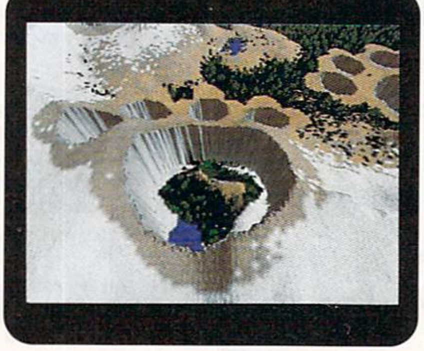
IFF to DEM landscape processor.

Of all the programs on my hard disk, VistaPro (Virtual Reality Laboratories) is just about my favorite, and as I'm continually seeking utilities that enhance it, I was anxious to give ScapeMaker a try. I wasn't disappointed.

Lay of the Land

Despite its name, ScapeMaker isn't a full-featured landscape editor like Virtual Reality's TerraForm. Rather, ScapeMaker is a specialized image processor that converts IFF graphics into VistaPro- and Scenery Animator (Natural Graphics)-compatible DEM (Digital Elevation Maps) landscape files.

ScapeMaker's spartan, 2.0-like interface presents nearly two dozen buttons atop the screen. If you prefer menus to buttons, alternative controls are there as well. And, if that isn't enough, you can also call the shots from ARexx. In spite of all this convenience, the screen hardly seems cluttered, thanks to the controls' ease of use. Below these buttons are two windows that hold DEMs in progress, and you can combine these or use one of them as a spare page.



Big "prints" are possible with ScapeMaker.

Using the program is easy: Load a graphic, choose the area you wish to convert into a DEM, and click on the MakeDEM button. That's all there is to it. Of course, if you have the RAM needed to multitask with your landscape program, you can immediately render the image for instant gratification.

If this were the entire ScapeMaker story, you'd probably be just as well off without it—after all, VistaPro allows you to load IFF brushes as landscapes. But ScapeMaker is also part image processor, and that's where things start to get interesting.

Landscaping Service

The program provides tools that allow some devilishly clever things to occur with landscapes. Only ScapeMaker can carve gargantuan paw prints into a landscape. I loaded a two-color cat's paw into one of ScapeMaker's windows and a DEM into the other. The AddDEM button combined them to give me the aftermath of a dinosaur-sized tabby's romp through VistaPro.

For a kind of "weather map" overlay effect, try the Inset button. Inset superimposes a smaller landscape over a full-sized DEM, and because the small scape just sits atop the big one, you can use it in a variety of ways—as a detail map, for example. Another control, Smoothing, is an essential function that polishes harsh edges in a landscape. Useful for IFF images packed with color data, ScapeMaker's four levels of Smoothing reduce color ridges into more aesthetic curves. The program's remaining controls, such as Add X, Add Y, and Scale, allow you to manipulate the height of scapes.

ScapeMaker is a great tool for merging landscapes as if they were double-exposed in a camera lens—such as my example of paw prints in the snow. But because it converts IFFs directly into landscapes (or combines them with existing scapes), it is also nifty for creating unusual images. It permits you to add clearly artificial, inorganic structures to landscapes, something not easily accomplished by any other means. You can add mazes, forts, trenches, or even company logos to a VistaPro animation. In fact, ScapeMaker shows promise as a top-notch logo generator. Just bring your logo into ScapeMaker from a program like DeluxePaint (Electronic Arts) or Imagemaster (Black Belt),

and then either carve it into the ground or extrude it up out of the grass and into the sky. There's no reason logos must always look like chrome.

HALF-BAKED 'SCAPES?

In some respects, ScapeMaker seems unpolished. The screen's odd palette colors give both the Arq 1.78 AmigaDOS requester replacement and my FR_Bypass file requester a hard-to-read monochrome color. Also, when converting part of a graphic into a landscape, you must select a region no more than 256 or 512 pixels square, depending on whether you use VistaPro's Small or Large size option.

Furthermore, I would like the option to scale a large image down to landscape size; instead, you now have to process the image into a brush elsewhere or convert only a small piece of it into a DEM. Finally, the program supports only "traditional" Amiga graphics formats. You cannot, for instance, load a 24-bit IFF, Half_Brite image or AGA format graphic into ScapeMaker. This is the sort of program that can someday make great use of Workbench 3.0's datatypes.

Despite these shortcomings, I love this program. It provides an easy way to transform IFF images into DEMs, and it offers nifty tools for creating unusual effects that would otherwise be impossible, such as VistaPro logo flyarounds and highly complicated, inorganic landscapes. ScapeMaker is an outstanding program and a "must have" for VistaPro owners.

—Dave Johnson

FRACTALPRO 6.02

MegageM, $199.95.

All Amigas.
2.0/3.0/AGA compatible.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
Minimum system: 1MB and math coprocessor or 68040.
Recommended system: AGA or 24-bit display board, 4MB RAM.

Fractal art and animation tool.

The Amiga is the undisputed champ of fractal art. No other machine since the discovery of chaotic math can match the Amiga's preponderance of fractal-engineering tools in both commercial and public-domain arenas. This market domination continues with MegageM's updated fractal art and animation tool, FractalPro, version 6.0.

With a large selection of fractal tools to choose from, FractalPro stands apart from the rest. It provides AGA compatibility, as well as support for all Amiga display modes and direct rendering to Impulse's Firecracker 24-bit display board. Throw in a nifty 2.0 interface, heaps of animation tools, and virtually infinite zooming, and you're on the road to chaos heaven.

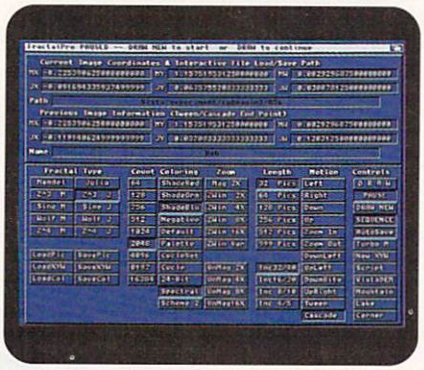
FRACTALS IN MOTION

FractalPro offers a wide array of equations for the rendering process. In addition to the basic Mandelbrot and its accompanying Julia set, it provides four other equations, including cube and sine sets of both Mandelbrot and Julia pairs, for a total of ten possibilities. Each equation base has a unique personality, and the real beauty of FractalPro is its ability to switch between the Mandel- ►

brot and Julia versions of any spatial coordinates. If you encounter an interesting slice of Mandelbrot, for instance, you can render the Julia set of those coordinates and then return to the Mandelbrot later.

A fractal program is only as good as its zoom, and the manual claims that FractalPro supports zooms up to 2000 trillion times. While I didn't zoom in quite that deep, I've closed in further with this program, I think, than with any other fractal package.

Want to pick up where you left off? When you save an image in FractalPro, you don't just get a graphic. The program automatically saves the coordinates and magnification of your image so you can reload it some time later, much as a 3-D modeler would store your scene for future use. Moreover, FractalPro saves images in VistaPro's (Virtual Reality) DEM format.



Fractal Pro's new control panel.

While the program gives you lots of control over the appearance of a single fractal image, that's nothing compared to what you can do with the included animation tools. You can zoom, pan, cascade, or tween (the last two require some explanation) around your fractal image and let FractalPro save each frame in a sequence of 16, 32, 64, 128, or more images that you can later assemble into an animation.

Panning is a fast operation here, because most of the image is moved around with the blitter and only the new strips of graphics data are calculated from scratch each time. Tween allows you to load two specific fractal images, and FractalPro automatically zooms and pans to link the two images in a specified number of frames. The cascade command is similar, but it gives the motion of Julia sets between two specific Mandelbrot coordinates. Cascade animations dance and swirl without ever really moving much—they're fascinating to watch.

Demanding Tasks

FractalPro is a serious tool that places demands on your system. With Commodore's discontinuance of support for Workbench 1.3, developers are tending to follow suit, and FractalPro now requires Workbench 2.0 or higher. Though it runs on all Amigas, the program must have a math coprocessor. While it will run on only one megabyte, I'd recommend having two or even four megabytes handy for serious work.

FractalPro has a lot of buttons, resulting in a screen that's fairly intimidating until you've worked your way around it a few times. Most program functions are duplicated in menus and the ARexx command set. Like NewTek's Digi-Paint, it comes with a program that allows you to perform ARexx scripts from the Shell if you don't yet own ARexx. This is of dubious value, of course, as the program requires Workbench 2.0, which includes ARexx.

If FractalPro sounds like a complicated program that would benefit from a tutorial, you're right. MegageM includes a separate tutorial book that accompanies the 40-page manual and gets you up and running pretty fast, even if you have never before used a fractal program.

A Ways To Go

FractalPro offers everything a serious artist of the fractal discipline would want or need, yet it is not without shortcomings—color control, for one. FractalPro initially renders your creation in monochrome green, red, or blue; to modify the palette, you have to tweak each of the image's colors individually, using DPaint-like RGB sliders. In a 16-color picture, this isn't a problem, but editing a 256-color AGA image is a masochist's delight. On the plus side, you can save palettes, but the program desperately needs more sophisticated color controls of the spread, swap, and blend variety. MegageM should take a lesson from the old standby public-domain program, MandelVroom, or any number of other popular paint programs.

Another weakness is in the choice of resolutions. Though most resolutions are listed in the screen-mode requester, FractalPro doesn't take advantage of AGA "doubled" modes or Super72 800×600, a very useful screen size. Hopefully, MegageM will let users pick a desired resolution in the next version by simply listing all the screen modes available, in a manner similar to that of DPaint IV-AGA.

Lastly, there seem to be peculiarities with the IFF images that the program saves. Rend24, a shareware animation and conversion tool I frequently use, crashed every time I tried to render a batch of FractalPro images into animations. I found that DeluxePaint-AGA, on the other hand, accepts the images just fine.

These are surprising deficiencies when you consider how good the rest of the program is, but given MegageM's aggressive stance, I'm sure they'll soon be addressed. In the meantime, be sure to add FractalPro to your list of required graphics tools.

—Dave Johnson

Studio Printer Software

Distributed by Macro Systems US, $99.95.

All Amigas.
Hard-drive installable.
Not copy-protected.
2.0 compatible.
Accelerator compatible.
Minimum system: Amiga and printer (dot matrix, DeskJet family and compatibles, or LaserJet family and compatibles).

Custom printer-driver software.

Thinking back to the early days of the Amiga, who can ever forget the lush, unprecedented color graphics and the jaw-dropping quality of the video? But all that goodness was marred by pathetically inaccurate and distorted printing. Hard copies were usually crude, grainy pixelizations or else streaked with thin, white horizontal lines, called banding. This weakness threatened to exclude Amiga users from the burgeoning desktop-publishing revolution. Fortunately, shareware programmers came to the rescue and quickly filled the public-domain channels with custom printer drivers that created high-quality output worthy of the computer.

Careful Drivers

Commodore made up for its early negligence with some fine printer drivers, but the shareware creators continued to hone their skills until one fine program outgrew its public-domain origins. Studio Printer is the updated commercial version of the old Wolf Faust printer-driver collection. The package is the best and most comprehensive solution to date for most printer-driver problems.

Studio is a total printing package that contains drivers for all popular printers, supporting all the internal typefaces and

the highest resolutions available. It drives everything from obscure dot-matrix machines to speedy 24- and 48-pin printers. You'll find support and control for the popular Hewlett-Packard DeskJet 500 and 500c color printers and the HP LaserJet series, all the way up to the top-of-the-line, 600-dpi HP LaserJet 4 machines.

Whereas conventional Amiga printer drivers print the standard 16 shades of gray and 4096 colors, the Studio's drivers provide printer output in 256 shades of gray and 16.7 million colors. They work with any program that supports Preferences printer drivers under Workbench, and, best of all, they are reliable.

But Studio is more than printer drivers; it includes extra software for customizing and fine-tuning text and graphics printing. It prints most varieties of IFF graphics (HAM8, IFF8, IFF24, and Extra Half_Brite) straight from the disk, so you can output pictures even if your system lacks the RAM or screen resolution to display them. You can choose the size of the printout—from tiny thumbnail to full page to multipage poster—and make the selection dynamically with the mouse or by typing in precise coordinates. Furthermore, it offers the choice of several print densities and a wide selection of dither patterns for fills, as well as allowing you to create your own.

The only weakness with the print-program portion of the Studio package is that it seizes control of the printer. You cannot print from another program while the Studio printer program is running, even if you are not currently printing with it. This is a minor annoyance to people who like to switch between their favorite programs without having to relaunch them, but it's not a major problem.

AREXX SUPPORT

Studio also provides ARexx support and compression for faster printing in high-quality graphics modes. New drivers for LaserJet compatibles (HP PCL5 printers) and support for printing from PageStream are included as well. A clever color-separation feature enables monochrome dot-matrix or ink-jet printers to print in color; but don't get the wrong idea—this is a lengthy and tedious process that involves swapping color ink cartridges or color ribbons. If you only occasionally need color printouts, however, it's a workable solution—and certainly cheaper than buying a color printer.

Studio really shines in printing graphics, the quality of its printouts approaching that of the Amiga's video output. In practice, the Studio drivers are faster than the standard Workbench drivers, and they offer improved printing. Although the high-quality print modes are slower than the standard drivers, the vast improvement in output quality is well worth the decrease in speed. The drivers minimize the banding that is common with dot-matrix printers, and they clean up DeskJet-generated printouts as well. Moreover, the laser printouts they produce are less grainy and have a more "even" appearance, making the laser-printed graphics look far more like professional screen shots.

THE DREADED DOCS

Studio's controls all rely on the Amiga's graphical interface, but they are not to- ►

Circle 7 on Reader Service card.

tally intuitive. You have to experiment before they become second nature, and you should expect to make frequent trips to the documentation, which, unfortunately, is the package's biggest drawback. The manual provides no easy solutions to problems. It also offers no simple, clear descriptions of what each program does, or explanations of who is most likely to need or want it.

The documentation is not all bad, though. Viewed as technical reference material, it is superb, but if you try to use it as an introduction to the nuances of printer-driver technology, it clearly needs improvement. There's little material that's useful for novices; a clear introduction would help lift this product a few rungs up the user-friendliness ladder.

Still, Studio is a product I highly recommend. It generally works well, and if you have both the time and patience needed to decipher the manual and fine-tune the settings, it will reward you with outstanding print quality.

—Daniel Greenberg

TOUCH FRAME

***Carroll Touch*, frame for IDEK monitor $540, controller $135.**

A2000/3000/4000.
Hard-drive installable software.
Not copy-protected.
Accelerator compatible.
2.0/3.0 compatible.
Installation: Easy
Minimum system: 2MB, WB 2.0

Touch-screen hardware.

Sci-fi buffs have long-envisioned the era of the touch-screen computer interface; now it's a reality that's trickled down to the consumer level. Carroll Touch, a long-time maker of touch-screen hardware, uses a proprietary infrared scanning technique that makes this space-age technology affordable for Amiga users. Its product line includes flat-panel, sealable displays and standard CRTs with clip-on Touch Frames, ranging from 13 to 21 inches. You use the appropriate display for the application.

NOTHING MORE THAN FEELINGS

A basic system consists of a monitor, the Touch Frame and its power supply, an RS-232 controller, and driver software. For this review, I evaluated an IDEK 17-inch, high-resolution monitor, a fitted Touch Frame, and the Amiga driver. Installation of the Touch Frame is extremely simple: Two small, adhesive-backed plastic mounting buttons attach to either side of the monitor case, and the Touch Frame clips on, blending in completely. A telephone-type cord connects the Touch Frame with the equally inconspicuous controller box and power supply, which in turn connects to the Amiga's serial port or multiserial card. The whole set-up procedure takes only about five minutes. Finally, you can install the software—including the touch-screen driver, calibration program, and on/off controls—onto your hard disk.

The Touch Frame itself blends in completely with the monitor. It performs its work by means of a grid of infrared sensors mounted along the inside perimeter of the frame. Place your finger on the screen, and the position where the beam is interrupted is translated into an X,Y mouse coordinate, to which the pointer then moves. The Amiga's operating system reacts as if you had moved the mouse and pressed the left mouse button. Removing your finger from the screen is the equivalent of re-

leasing the left mouse button. You can emulate right mouse-button commands by holding down the CTRL key on the keyboard and touching the screen. The infrared grid tracks finger movements quite accurately and quickly, but the resolution is obviously not as fine as that of a mouse.

The only software setup, beyond copying a few files to the system, entails running the calibration program. This you can do in less than a minute, touching the upper-left and lower-right corners of the monitor screen so that the grid/coordinate translations are scaled to the monitor and display specifications you have set in Preferences. You turn the Touch system on and off by clicking on an icon; the mouse is not disabled.

Adaptations

Using the Touch System requires either a specially-designed application or a little getting used to. The nature of touch screens is peculiar at best. The system tracked my touch flawlessly in any program I ran, including games. I never realized how plump my apparently bony forefinger was until I tried to position the pointer over a small Workbench button. I needed to make a conscious effort to realize a touch not only moves the pointer but is also the equivalent of depressing the left button. When used with applications software for which it is intended, the process gives you a wonderfully liberating feeling.

Specialized applications would include a control screen or panel with reasonably sized (quarter-inch square) buttons for all actions. Such an interface could easily be designed for existing programs by using, for example, AmigaVision (Commodore) or CanDo (INOVAtronics) and ARexx. A point-of-sale or information kiosk is a natural application for this system. Other possibilities that spring to mind include educational or reference software (for schools, libraries, small children in the home) and a commercial or industrial control system. Imagine an audio/video system's serially controlled patching matrix completely reconfigured in an instant by simply pointing to sources and destinations. Finally, there are people unable to control a mouse who need an alternative access system.

For more physically demanding installations, another product in the Carroll Touch line might be more appropriate. I'm happy to note that the company offers a free 30-day evaluation of some of its products. I would strongly advise developers and entrepreneurs to investigate the Touch Frame as the interface for turnkey systems or any of the above possible applications. It is simple and reliable, and it works.

—Michael Hanish

Continued on p. 64.



Press on and touch away with the Touch Frame.


21 MB
Floptical Diskette
CCS
BERNOULLI
Transportable
The Box 150
IOMEGA
IOMEGA
FIVE YEAR
BERNOULLI
MultiDisk
150
Write
Protect
DO NOT COVER

MASS STORAGE... To Go

Large capacities, easier to back up, conveniently portable . . . today's removable-media mass-storage devices go a long way towards satisfying users with insatiable appetites for data.

BY SHELDON LEEMON

HARD DRIVES FILL up. It's a fact of life. Sure, they save and load data very quickly. Sure, they're convenient to use, providing access to your programs and data as soon as you turn on the machine. But no matter how big your hard drive is, no matter how much you compress your data, you can be sure that some day, you're going to see that "Volume '20Gigs' is full" requester.

Storage capacity is only one of the reasons that computer owners have started looking for alternative mass-storage devices. Because fixed hard drives store so much, they are difficult to back up on a regular basis, leaving you vulnerable to catastrophic data loss if anything goes wrong with them. Also, they're not very portable, which makes it difficult to transfer their contents from one computer to another.

If you're looking for unlimited storage, archival backups, and transportability, you're in luck. Within the past couple of years, manufacturers have introduced a number of alternative mass-storage devices. All use removable media (sort of like a large-capacity floppy disk), which gives them unlimited storage capacity. Almost all use a standard SCSI interface, which makes them easy to connect to any Amiga.

These devices vary widely, however, in the amount of data they can store on each disk or cartridge, the speed at which they transfer data, their overall reliability, and the cost of the drive and the media. In the second half of this article, we'll take a look at four general types of mass-storage alternatives—removable-media hard drives, magneto-optical drives, flopticals, and tape back-up systems—and examine some specific models in each category. As always, it's up to you to decide which combination of features best suits your needs. (*For information on contacting the manufacturers of drives covered in this article, consult* ►

PHOTOGRAPHED BY EDWARD JUDICE

the "Manufacturers'/Distributors' Addresses" list on p. 90.)

Before we do that, though, let's cover some basic facts about removable-media devices.

Using Removable Media Drives

ALTHOUGH THE VARIOUS removable-media drives employ different technologies, you use them just as you would a normal hard drive. First, you must figure out where to physically install them. Almost all of these devices are the size of a 5.25-inch or 3.5-inch floppy drive, which means that you can mount them internally if you have an open drive bay of the appropriate size. Since portability is a big drawing card for these devices, however, you may wish to spend an extra hundred dollars or so and get an external version with its own case and power supply. That way, you can use the same device with more than one computer. To communicate with the drive, your computer will need a SCSI drive controller, such as Commodore's A2091 or A4091, or the built-in SCSI controller in the A3000 or upcoming A4000T.

Before you use any of these drives, you must prepare them just as you would any other hard drive, using either the hard-drive software that came with your SCSI controller (it may be called partitioning or formatting software in the documentation) or Commodore's HDToolBox program. Although HDToolBox was designed primarily for Commodore's own controllers, you can use it with almost any controller by specifying the SCSI device name as a ToolType in its icon. For example, you can use it with a GVP controller by adding the ToolType "SCSI_DEVICE_NAME=gvpscsi.device," or with ICD's Trifecta by adding "SCSI_DEVICE_NAME=trifecta.device."

Portability is a big drawing card with these devices. An extra hundred dollars or so will get you an external version that you can use with multiple Amigas, or with Macs or PCs.

The preparation program will usually determine what type and size of drive you are using by sending an inquiry to the drive itself. Once it has this information, you can partition the drive. You should partition each cartridge exactly the same way, however, to avoid confusing the computer when you change cartridges (AmigaDOS can't understand what's happening if you replace a 121MB dh0: drive with a 60MB dh0: and a 61MB dh1:). The safest practice is to use one partition, and the same drive identifier (rh0:, for example) for each cartridge. After writing the partition information, you can use the AmigaDOS "Format" program to format the cartridge, like any other disk.

The latest Amiga SCSI controllers automatically sense when a cartridge is removed or inserted, and take the appropriate action to remove or display the disk icon. I used ICD's Trifecta controller with a number of drives, and in each case it handled the media change without problems. Even if you have an older SCSI controller, you can still use removable-media drives. At worst, you'll have to use the AmigaDOS DISKCHANGE command to manually indicate a change of cartridges. In most cases, however, if your controller card does not automatically recognize removable media, you can buy a ROM update from the card's manufacturer that will allow it to do so.

Removable Media Drives and Emulation

Removable media drives can be very handy for those who use PC or Macintosh emulators, since you can convert an Amiga drive to a Mac or PC drive simply by changing a cartridge. If all you are interested in is a single PC or Mac partition, you will have no problems if you use the drive as if it were a fixed hard disk. You will probably not be able to change the media under DOS or the Mac operating system, however, without a PC or Mac driver that understands removable media.

The situation becomes a bit more complicated if you require media compatibility—the ability to take the cartridge that you wrote on your Amiga and put it into a drive connected to a PC or Mac. As long as the drive follows the IBM hard-drive standard, you should be able to read and write the cartridges using Consultron's CrossDOS program. For example, Bernoulli's 150MB cartridges come formatted for MS-DOS; by using the CrossDOS installation program, I was able to read and write them without additional formatting, thus ensuring complete compatibility with PC systems. Some manufacturers of PC-compatible SCSI host adapters, such as Corel, do not use standard IBM formatting, which means you won't be able to exchange cartridges with systems using those kind of controllers. The best way to ensure compatibility is to format the cartridge on the system with which you wish to exchange data. It's a lot more likely that you will be able to read their format than they will be able to read yours.

To achieve media compatibility with Macintosh systems, you must use a Mac emulator, such as ReadySoft's A-Max or Utilities Unlimited's Emplant, and some kind of Macintosh SCSI driver. I've used Apollyonics' SCSI Director program successfully under A-Max with several different removable-media drives. Unfortunately, you won't be able to read data you have written this way under AmigaDOS. The easier way to exchange data between Macintosh and Amiga is to use IBM format for both. Like CrossDOS on the Amiga, Insignia Solutions' Access PC, Version 2 allows you to read and write IBM media on the Macintosh. If you use Access PC to read and write IBM-format data on the

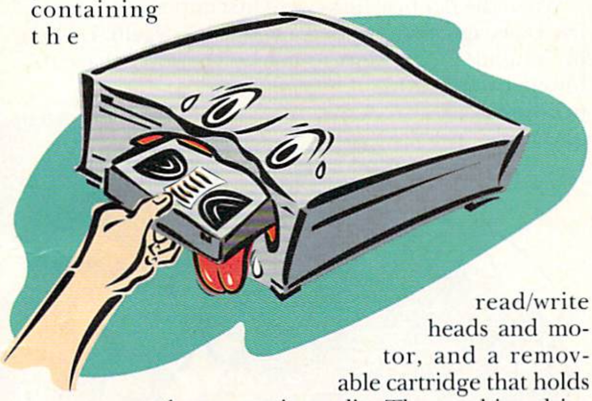
Macintosh or Mac emulator, you will also be able to read and write that data on the Amiga, using CrossDOS. And, of course, that same data can also be used with IBM systems.

Alternative Mass-Storage Devices

NOW THAT WE know a little about their general setup and operation, let's take a closer look at the four basic types of removable-media drives—and the variations within each category.

Removable-Media Hard Drives

The most common type of removable mass-storage device, and the one that's been around the longest, is a variation on the standard fixed hard drive. Removable media hard drives divide the conventional, hermetically-sealed unit into two components—a fixed unit containing the read/write heads and motor, and a removable cartridge that holds the magnetic media. The resulting drive performs like a hard disk, but allows you to remove the disk for safekeeping or transport like a floppy. When you run out of storage, you simply buy more cartridges.



SyQuest is one of the most popular manufacturers of removable-media drives. Its original drive used a 5.25-inch mechanism with cartridges about the size of a stack of 5.25-inch floppy disks, which held 44MB each. The next generation stored 88MB using the same size drive and cartridges (cartridge costs run about $1.25 per megabyte). These 88MB drives could read the 44MB cartridges, but not write them. Recently, however, SyQuest has come out with a combination 88/44MB drive, the **SQ5110C**, that can read and write both types of cartridges. Selling for about $650, it costs only about $100 more than the previous model (which sells for about $500 for an internal and $600 for an external drive). The improved compatibility is important if you wish to send your data to a company that prints color images to film or videotape for a fee. Many such companies accept the huge files these images require on either the 44 or 88MB SyQuest cartridges.

SyQuest's most recent entry, the **SQ3105**, uses a 3.5-inch mechanism and cartridge that resemble miniature versions of the originals. Despite the reduced size, this drive is much quieter than previous models (which tended to clunk rather loudly), is somewhat faster, holds 105MB per cartridge, and costs nearly the same (around $700) as the combination 88/44MB drive. What this unit gains in speed and size, however, it loses in compatibility, since the cartridges for the older drives are larger than the entire 105MB drive.

Along with the familiar SCSI version, the SyQuest 105 is also available with an IDE interface (model **SQ3105A,** around $700). We were unable to obtain an IDE version for testing, but SyQuest engineers have tested the drive with Amigas and some third-party host adapters. They found direct compatibility with ICD's Trifecta and AdIDE adapters, and with Expansion Systems' DataFlyer; Pre'spect Technics also claims compatibility with its IDE controller. Because the engineers found the A4000's internal drive controller to be incompatible with the 3105A, they have created a special ROM to ensure compatibility (it was in Beta testing at the time of this writing). If you purchase a 3105A for use with the A4000, you'll need to get a replacement ROM direct from SyQuest—unless the drive you buy is already configured for the Amiga 4000.

Although SyQuest is the most recognizable name in the removable-media market, it wasn't the first to market cartridge drives. That distinction belongs to Iomega, a company that has been selling its Bernoulli disks since the days when 20MB was considered unlimited storage. Iomega's patented mechanism eliminates the possibility of the read/write heads colliding with the media (a disaster known as a head crash), making their drive much more reliable than normal hard drives. While the SyQuest media is rated safe for a 30-inch drop to a linoleum floor, a Bernoulli demonstration video shows one of its cartridges being thrown out of a car going 60 mph with no loss of data!

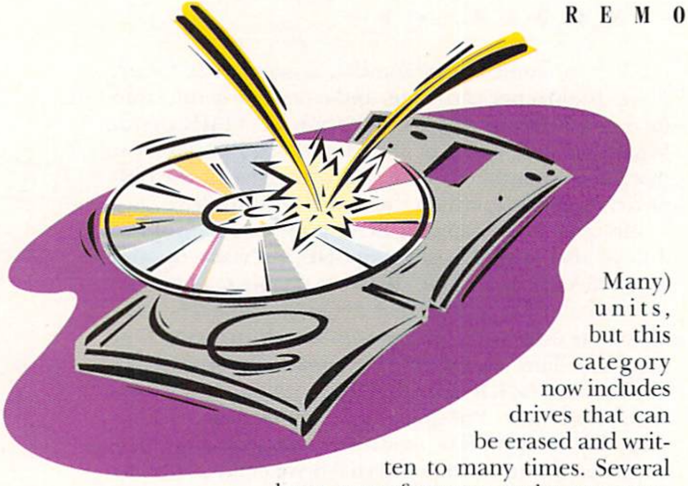
You used to pay a large premium for this reliability, but no more. ***Iomega's* 90MB** 5.25-inch drive costs about the same as the SyQuest 88-megabyte units, while its new **Box 150** drive costs $1225 for the external unit and $1099 for the internal. The media costs a little less than a dollar per megabyte. This Bernoulli MultiDisk 150MB drive is as fast as most standard hard drives, and it is compatible with a wide range of previous Bernoulli media—with capacities ranging from 35 to 90MB. It is also extremely quiet. Iomega holds another distinction among removable-media manufacturers. It is the only company that includes Amiga installation instructions with its drives.

A few years back, Ricoh came out with a 55MB removable cartridge drive to compete with the SyQuest 44MB drive. This drive worked well, but never seemed to catch on like the SyQuest and Bernoulli units. You may still find these drives around, and since they have become a bit outdated by the larger capacities offered by competitors, you should be able to pick them up for a couple hundred dollars less—something to keep in mind if you are working on a tight budget.

Read/Write Optical Disks

One of the newer mass-storage technologies is the magneto-optical disk. Like a CD-ROM, it uses a laser beam pickup to read the disk, but unlike a CD, you can write to the disk. At first, optical drives were limited to WORM (Write Once, Read ►

ILLUSTRATIONS BY DARRYL SHELTON



Many) units, but this category now includes drives that can be erased and written to many times. Several large manufacturers make magneto-optical drives, including Sony, Panasonic, and Ricoh.

On the plus side, these drives offer lots of storage space. The standard capacity of a 5.25-inch double-sided cartridge is 650 megabytes of data, but some manufacturers are starting to offer double-density units that offer 1.3GB (i.e., 1300MB) of storage on a single $250 disk. Because of the laser technology, the drives are extremely reliable and virtually silent when you read from and write to them. On the negative side, the full-sized 5.25-inch drives tend to be slow (some operating only about one-fourth the speed of a normal hard drive) and expensive (costing upwards of $3000).

A newer type of magneto-optical drive sacrifices some of the storage space in order to make gains in the area of performance and price. These drives use 3.5-inch cartridges that are about the same size as a floppy disk, but hold 128 megabytes of data. The 3.5-inch drives are much smaller than the half-height or full-height 5.25-inch drives and considerably faster—achieving speeds in the low-end range of normal hard drives. In the Amiga market, ***Digital Micronics*** sells a version of the Sony drive, the **DMI 128MB Read/Write Optical Disk Drive** (internal, $1795; external, $2195). While the drives themselves cost about twice as much as equivalent removable media hard drives, at less than $65 each, however, the 128MB optical disks are half the price of hard-drive cartridges. Therefore, if you plan to store more than a gigabyte, the magneto-optical system actually ends up being cheaper.

If you are looking for a combination of really huge storage capacity and high performance, and price is no object, you will want to look at the 5.25-inch ***Maxoptix*** Tahiti drives. The **Tahiti I** (discontinued) and its successor the **Tahiti IIM** read and write both the standard 650MB format and a proprietary 1GB format. Maxoptix has recently introduced the **T3-1300** drive ($3495), which adds a standard 1.3GB density to the other formats. All these drives perform substantially better than the run-of-the-mill magneto-optical drive. The Tahiti IIM promises an average 35 millisecond seek time, while the T3 boasts an average seek time of 19ms—on a par with most standard hard drives. The T3 may be pricey, but the Tahiti IIM and even some Tahiti I drives are still around, for much less (I've seen refurbished Tahiti drives selling for as low as $1000). Although the initial price of the drive is pretty steep, the incremental cost per megabyte of storage is under 25 cents, less than half of what you'd pay for 3.5-inch magneto-optical cartridges, and less than a quarter of the cost of hard-drive cartridges. If you use write-once media for archival storage, costs are even lower. The upshot is that if you plan to store more than three or four gigabytes eventually, and require fast access, the Tahiti may be your most economical solution.

Floptical Disks

Another new mass-storage option is high-capacity floppies, the best of which is ***Insite Peripherals'*** version, the **1325VM Floptical Disk Drive** ($399). Such drives combine high-density media with optical head positioning to get 20 megabytes of storage on a single floppy. While faster than floppies, these drives are still much slower than conventional hard drives, and the media costs a bit more per megabyte than normal floppies (currently about $20 per disk, though industry officials have predicted they may fall as low as $6 in the near future). As a bonus, the drives also read and write normal floppies using the 1.44 megabyte IBM format. In the Amiga market, ***AgogA Corporation*** sells the Floptical complete with driver software. I have also used the standard Insite drive without any driver software, using HDToolBox to install the Rigid Disk Block.

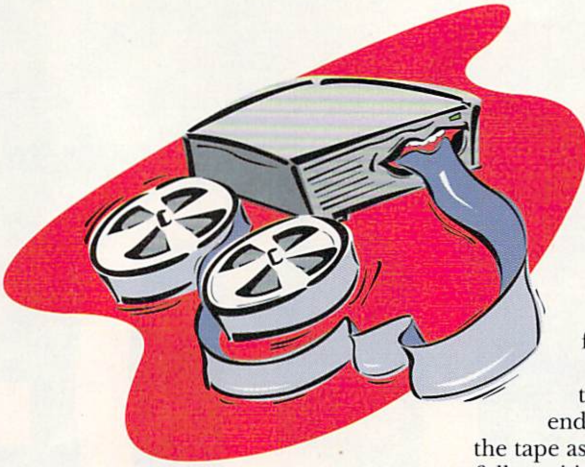
When the floptical disks were first announced, about five years ago, they seemed a fantastic bargain. Delays in bringing the product to market, however, have allowed other technologies to catch up



and, in some cases, to pass the flopticals by. At current prices, these units cost nearly as much as the 90MB removable hard drives, but are far slower and a bit less reliable. Unless the price of floptical drives and media drops enough to give them a significant price advantage over the competition, there won't be much incentive to buy these drives.

Tape Back-up Systems

For those whose mass-storage needs tend towards back-up and archival storage, tape back-up systems have traditionally provided the most cost-effective solution. The drives start in the $500 range, and 250MB tapes cost about $15. The biggest drawback to tapes is that they are slow and sequential in nature. Unlike disk drives, which allow you to access any part of the drive almost instantly, tape drives must wind the tape to get from one section to another. This means that it may take almost as long to find a single



file at the end of the tape as to restore a full partition.

Because tape drives are not normal file-oriented devices, you also need special software to use them for backups. (For a roundup of such software, see "The Great Amiga Back(up) Off," Feb. '93, p. 49). Both New Horizon's Quarterback and Moonlighter Software's Ami-Back provide full tape support, allowing you to back-up and restore an entire hard-drive partition, or selected files. Both allow you to make multiple sequential backups on a single tape in order to take advantage of the large storage capacities. In addition, Moonlighter has recently announced its TapeWorm file-system software, TapeWorm-FS ($129.95), which will allow you to use tape drives directly with any Amiga software, as if they were write-once hard drives.

There are a number of different kinds of tape backup systems, and almost all of them will work with the Amiga, provided they use a SCSI interface. Avoid the cheap IBM tape systems, which are likely to be incompatible, and look instead for Macintosh drives. The least expensive are the streaming-tape drives, such as ***Commodore's*** **3070** ($699, but now discontinued), or ***New Horizon's*** **Touchdown 100** tape system ($499.95). These units store up to 250MB on a single tape, at speeds of up to 5MB per minute. Using the Touchdown drive, I was able to back up a 100MB partition in about 16 minutes, and restore the same partition in about 19 minutes. While it only took about a minute to restore a single file near the beginning of the tape, it took almost 16 minutes to restore five files scattered at various points on the tape. I also found the tape drive to be much noisier than other removable media devices.

A newer tape back-up technology uses a computer grade of Digital Audio Tape (DAT) technology to get much more data on much smaller tapes. While the 4mm DAT drives may cost up to twice as much as the older streamers, they can get over 2GB of data on a single tape that costs about $17. They are also much quicker and quieter than the older models. A typical example is the **Archive Python** drive ($750) from ***Moonlighter Software*** (the company also sells the **Viper** streaming-tape drive for $800). Using the Python, I was able to back up a 100MB hard-drive partition in under 10 minutes, and restore it in under 13 minutes. Most of the new DAT drives support the SCSI-2 specification, which includes a "fast search" command for tape drives. As a result, the same five files that took 16 minutes to restore from the streamer took only about a minute to restore from the DAT. If finding a single file quickly is high on your list of priorities, you will undoubtedly want a drive (and controller) that is SCSI-2 compliant.

The top-of-the-line ***Exabyte*** **EXB-8500** ($2700) is of special interest to those involved in video work. This tape drive holds over 5GB on a single 8mm tape (the same size used in 8mm video), enough for about five minutes worth of video frames, uncompressed. Even with this huge capacity, it takes less than five minutes to selectively restore a file from almost anywhere on the tape. Standard tape backup is not its only function, though.

Digital disk recorders such as the Abekas A65 use the Exabyte tape drive to store digital video data, and ASDG sells a driver that allows you to store 24-bit images directly to Exabyte tape in this format. This means that you can render a sequence of frames with a 3-D program like NewTek's LightWave, store them on tape, take that tape to a studio that has an Abekas digital disk recorder, and lay the images off to whatever videotape format you want. For an hour of studio time (at a cost of about $150), you can lay off from one to two minutes of video with true digital quality.

Although the Exabyte tape drive, which can be purchased from Amiga vendors like ***Anti-Gravity Workshop***, goes for about $2500 (with ASDG software), the cost is much less than a frame-accurate VTR and single-frame controller combination. For the money, you not only get a superb back-up and archival storage system for your huge animation sequences, but you also gain the ability to store your animations in an industry-standard digital-video format. (*Editor's Note*: For a different kind of tape back-up system, and one on the low end, check out ***Lyppens Software's*** **Video Backup System**, which uses your VCR instead of a specialized drive. The system does not fit into this article for several reasons, but *AW* does plan to review it in an upcoming issue.)

Which One Should You Drive?

You may find the sheer number of removable-media solutions to be confusing, but the quality and price of these drives makes it hard for you to go wrong. In the end, factors like how much you need to store, how much you have to spend, and compatibility will dictate which you select. If you need less than a gigabyte of storage space, you will be able to find a removable hard drive or streaming-tape drive for well under $1000. If sending your work to a service bureau for output to tape or film is a major goal, ask them what formats they accept and buy that brand (most use SyQuest drives). If you're using the drive primarily for your own personal system, the cost and reliability of Iomega Bernoulli drives can't be beat.

If you plan to store more than a gigabyte of data, magneto-optical or DAT tape is your best bet. Although magneto-optical drives are more expensive, they give you the fastest access to huge quantities of data. If you simply want somewhere to store those huge animation sequences after you finish a video job, however, 4mm DAT tape may be more cost effective. If you wish to combine huge storage with digital-video compatibility, the 8mm Exabyte is the only way to go. ■

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PIONEER
POWER
CD-ROM CHANGER DRM-604X
BUSY
AUDIO
LaserMemory
Kodak
Photo CD
PLAYER DEMO DISC
Contains:
• Player Demo
• Practice Pictures

CD-

-ROM '93

Recent innovations in CD-ROM technology are making CD-ROM drives a more viable alternative for Amiga users.

Developments in the CD-ROM field over the past 12 months are making the technology faster in its delivery, more versatile in its uses, and more attractive in its appeal to Amiga computer users. If you followed *AW*'s coverage of the state of CD-ROM in 1992 (see the March and August issues), you may be surprised at how much has changed.

The past year brought dramatic increases in the speed of CD-ROM drives. The newest crop of drives take half as long to move to a new spot on a CD-ROM, and once there, transfer data at twice the speed. The new drives take advantage of new software systems, too, such as Kodak's Photo CD system. New features—such as the furthering of the CD-ROM-XA extensions and the development of "multisession" (writable) discs—are also in the CD-ROM forefront. And, the makers of Amiga CD-ROM driver software have been hard at work, too.

CD-ROM technology is making a big splash in every computer marketplace. The Optical Publishing Association predicts an installed base of nearly six million CD-ROM drives in the United States by the end of 1993. It also expects more than 1.2 million stand-alone consumer devices that include CD-ROM drives, such as Phillips' CD-I, the Kodak Photo CD player, the Tandy VIS system, and, last but not least, Commodore's CDTV.

Adding CD-ROM

Adding a CD-ROM drive to an Amiga isn't difficult. First, you need a SCSI interface. SCSI is built-in to some Amigas, easy to add to most. Only the Amiga 600 suffers in this respect.

Second, you need a software driver that interfaces the CD-ROM drive to the system. Fortunately, there are three choices that do the job at very reasonable prices.

Finally, you need to strike an agreement between your pocketbook and your desire for the latest-greatest in hardware. Older drives are much more affordable than the newest ones. Although the older drives are slower, they're still reliable transportation to the realm of gigabytes and gigabytes of data.

Further on in this article, we will look at some detailed specifics on adding a CD-ROM drive to the new Amiga systems; for those with older machines, see "The Charge of the CD Brigade," Aug. '92, p. 35, for additional information.

Speed Demons

The speed of a CD-ROM drive is measured in two ways.

Access speed measures how quickly the mechanism can move from place to place. Ordinary hard disks have access times in the range of 10 to 60 milliseconds. CD-ROMs are much slower—the fastest take 200 milliseconds (ms).

Transfer speed measures how fast data can move from the drive to the computer, once the drive is positioned to the right spot. At the older "normal" CD speeds, the data transfer rate was consistently clocked at 150K per second. The newest CD-ROM drives transfer data more quickly by spinning the disc at twice the normal speed. Historically, "normal" CD speeds were defined by the rate of spin of audio compact discs. The new generation spins the disc faster when reading data. When asked to play audio discs, they return to normal speed.

The earliest CD-ROM drives, such as the **NEC CDR-77**, (now discontinued) had access speeds of 450 to 1500 ms. Unfortunately, ***Commodore's* A570** CD-ROM drive for the Amiga 500 fits in this category, weighing in at a hefty 500 ms.

In the next batch of drives, access times dropped to between 380 (as with ***Chinon's*** discontinued **CD-431**) and 320 ms (for the **Toshiba 3301B** and **NEC CDR-73**). You can generally ►

By John Foust

PHOTOGRAPHED BY ED JUDICE

buy these first- and second-generation drives for a song. Some places sell refurbished drives for as little as $200. And Xetec bundles its software with an external Chinon 435 for $499.

Beyond raw speed, however, other features come into play. The fine print often mentions "CD-ROM-XA." This standard provides a type of multitasking within the drive itself. While playing audio, it continues to deliver data. For example, CD-ROM-XA can be used to play animations directly from disc while playing the soundtrack from disc, too.

"Multisession" is the term for the new writable CD-ROM systems. These can add files to recordable discs that can then be read in any CD-ROM system. CD-ROM-XA extensions are also necessary for reading multisession discs such as Photo CDs. The older ISO-9660 standard didn't consider multisession recordings.

There are two varieties of CD-ROM-XA compliance. Drives labeled as "XA-ready" can read the extensions of CD-ROM-XA, but can't deliver the full interleaved data. An XA-ready drive can read Photo CD discs but can't deliver audio and data in accordance with the standard.

CD-ROM Drives at a Glance

DRIVE	LIST PRICE[1]	TRANSFER K/SEC	ACCESS MS	XA SUPPORT[2]	MULTI-SESSION?
CBM A570	$659.99	153	500	N	N
Chinon CD-435	$495	150	350	N	N
Chinon CD-535	$645	300	280	R	Y
NEC CDR-73	$725	210	320	C	N
NEC CDR-74-1	$550	210	280	C	Y
Pioneer DRM-604x	$1845	600	350	C	Y
Sony CDU-561	$648	300	280	C	Y
Texel DM-3024	$499	300	265	R	N
Texel DM-3028	$499	335	240	R	Y
Toshiba 3301B	$600	150	320	C	N
Toshiba 3401B	$695	300	200	C	Y

[1] Prices are for external versions.
[2] N=no XA compliance, R=XA ready, C=XA compliant.

Drives called "XA-compatible" or "XA-compliant" are more expensive, but can perform this multitasking trick.

The newest drives provide CD-ROM-XA and multisession support—and can access data in 200 to 280 ms. They also offer greater data throughput by using the new SCSI-2 and SCSI-Fast specifications. Examples of the newest, fastest drives include the **Chinon CD-535**, **Texel DM-3024** (which will be superseded, by the time you read this, by the external **DM-3028** and the internal **DM-5028**), **Toshiba 3401B**, **NEC CDR-74-1**, and the **Sony CDU-561**, which is remarketed as Apple's "Apple300" CD-ROM drive. These drives cost between $450 and $550 for internal versions; unless you buy from an Amiga dealer such as Vertical, which bundles Texel drives with interface software from Canadian Prototype Replicas, you'll need to purchase driver software separately.

Tomorrow's drives will spin at four times the old rate, transferring data at more than 600K per second. ***Pioneer*** has already introduced a "quad-speed" drive, the **DRM-604X** ($1845), but the unit sports only a 350 millisecond access time.

Upcoming drives will also hold multiple CDs. Much like the consumer audio systems that can switch between several discs, the DRM-604X contains a single CD-ROM reader combined with a mechanism for selecting one of six discs stored in a cassette. To the Amiga user, six new icons appear on the Workbench. Click on a disc that isn't active, and the drive automatically loads it for access.

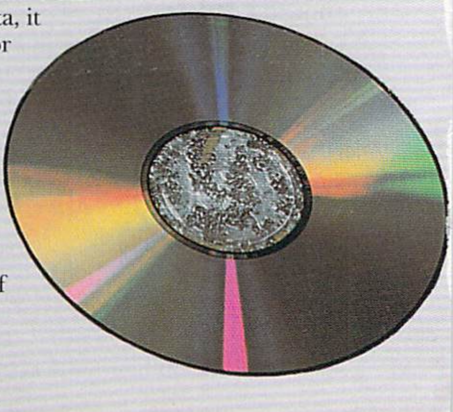
If six discs at a time isn't enough, there's a 100-disc changer from ***NSM Information Systems***. Originally designed for automating radio stations, the **CDR-100SC** contains two racks that hold up to 50 discs each. Switching between discs takes as little as 12 seconds. A robotic arm moves discs from the racks to an ordinary SCSI CD-ROM drive at the heart of the system. The robotic arm is directed by text commands sent via a serial port, so it can easily interface to an Amiga. With an end-user price of $6500, the CDR-100SC delivers more than 31 gigabytes of on-line storage.

Because all CD-ROM drives have the same basic features, your decision will come down to price and your needs in terms of multitasking, recording, speed, and so on. Keep in mind, though, that while the evolution to faster access and transfer rates is significant, in daily use you will not likely see much difference between, say, a 250 and a 280 ms drive —unless your application is extremely data intensive. For a comparison of access and transfer speeds, as well as other features, see the accompanying chart, "CD-ROM Drives at a Glance."

DIGITAL SAMPLING

Given the similarity between audio compact discs and CD-ROMs, the perpetually curious often ask if it's possible to use a CD-ROM drive to read the digital samples of sound directly from an audio CD. Until now, the answer has been "no."

The new Toshiba 3401B can transfer audio data over the SCSI bus, but the answer hasn't changed to an unqualified "yes." Audio compact discs still possess the software equivalent of a "read-protect tab" that prevents them from being copied in this fashion. Although the new Toshiba drive can read the audio data, it continues to honor this copy-protection at a very low level. A market might develop for audio discs that can be legally sampled, such as sound-effects discs. Of



course, support for direct sampling would need to be added to Amiga software drivers, too.

New Software

Three vendors offer software to link a SCSI CD-ROM drive to the AmigaDOS file system: ***Xetec*** (**CDX Disk Set**, $50), ***Canadian Prototype Replicas*** (**CDROM-FS**, $39.99), and ***Asimware*** (**AsimCDFS**, $79). The three packages are very similar; each now includes support for older High Sierra discs, ISO-9660 discs, and Macintosh-specific HFS (Hierarchical File System) discs.

All three developers have been hard at work. For example, Xetec's software sports a new installation utility. It scans the system to choose the SCSI device and optionally checks the SCSI bus for CD-ROM devices. Mounting the drive is automatic under AmigaDOS 2.0 by way of a "CDX" icon in the "devs/DOSDrivers" drawer, similar to the way CrossDOS is implemented.

On the Macintosh, files have a dual nature. Instead of a single block of data, files have two "forks," known as the data fork and the resource fork. Most applications store their information in the data fork. A few store useful information in the resource fork. Without a way to select which "fork" you want to load, you can't access every file on some Macintosh CD-ROMs. Xetec's software lets you easily choose the data or resource forks by appending the sub- and super-script "1" and "2" characters to the filename you enter in any Amiga program's file requester to distinguish them.

There are new features for audio, too. Inserting a music compact disc into a CD-ROM drive makes a "CDDA" icon appear on the Workbench. A simple double-click starts the music playing.

For programmers, most of Xetec's software includes an ARexx scripting interface. It also provides an even lower-level programming interface to read CDs at the block and bit level from within your own programs.

Currently, what distinguishes the three packages most is not so much their functionality, but the CD-ROMs they come bundled with. The least expensive package, CDROM-FS, comes without discs, while the highest priced, AsimCDFS, provides a disc called Fish Market 2.0, which contains all the freely distributable software on Fred Fish disks 100–880. The CDX Disk Set strikes a balance in price and offerings, providing the contents of Fish disks 1–470 on CD-ROM.

Kodak Photo CD

The past year marked the long-awaited introduction of ***Kodak's*** **Photo CD** system. If your pocketbook can't justify the cost of a flatbed scanner or video-capture system, Photo CD may be an affordable alternative.

Kodak has elevated its photofinishing shops to the Age of Computers. These shops can scan your color negatives at very high resolutions and store the resulting data on a CD-ROM. The Kodak Photo CD disc also serves as a "digital negative," meaning a photofinisher can make traditional paper prints directly from the CD. Of course, using Photo CD still requires an investment in traditional photography equipment, not to mention skill in using a camera plus the regular cost of film processing.

Converting a 24-exposure roll to a Photo CD and a contact print is about $50, including a disc. With multisession recording, that one disc can hold another three rolls of film, scanned at about $40 each. Scanning and recording a 24-exposure roll of film takes about 15 minutes, but many Photo CD photofinishers still require several days to process your order.

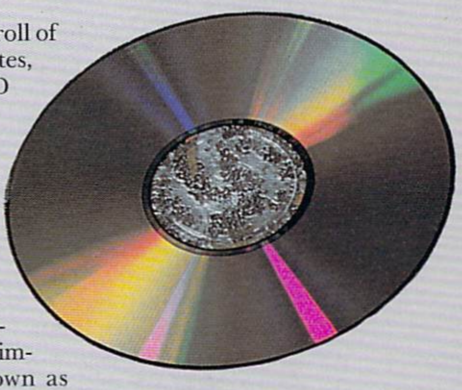


Photo CD is much more than a negative-scanning service. It includes a new method of representing color images. Most personal computers represent scanned images with a system known as "24-bit" color, meaning each pixel's color is represented as a mixture of values for red, green, and blue. This means three eight-bit bytes for each primary, with each value ranging from 0 to 255.

Photo CD introduces an alternative color system called PhotoYCC. Reminiscent of the volume knob on Spinal Tap's amplifier, PhotoYCC effectively extends the dynamic range of color information, as if RGB values could vary from -50 to 512 instead of 0 to 255. This dramatically improves upon the 24-bit RGB system, which is only an approximation of true color. The white pixel that results from byte values of 255, 255, 255 is not the same white in the glints of sunlight on the harbor in your vacation picture. Similarly, the RGB system won't adequately represent the fluorescent colors in your Hawaiian shirt.

Photo CD shops can use this extra information to perform the electronic equivalent of traditional darkroom tricks to correct the appearance of your color prints. With the right software, you can do it on your personal computer, too.

The Photo CD stores each image in five different resolutions, ranging from 128×192 pixels to 2048×3072 pixels. The highest-resolution image requires at least 19 megs of RAM for the image alone, not to mention overhead consumed by the program itself or a second copy of the image for viewing image-processing results.

Photo CD has unofficial support on the Amiga because of a renegade software effort from the Internet network. In the PC and Macintosh worlds, Kodak has official support. Xetec's CD-ROM software includes a CLI-based utility called "PCDtoIFF" that successfully converts Photo CD files to IFF-24 images. Centaur Development's OpalVision display card includes a Photo CD loader, and the next version of Asimware's CD-ROM software will include Photo CD support, too.

CD-ROM for the New Amigas

Unlike the A3000, the newest members of the Amiga family are not ready to use CD-ROM out of the box.

The Amiga 600 has a standard PCMCIA (Personal Computer Memory Card International Association) interface slot. PCMCIA is used on other computer types, especially laptops. Although this gives A600 users the freedom to enjoy the lower prices brought on by the economies of scale in these other markets, there's a catch. Without software support, these devices are useless to the Amiga 600. Several companies make PCMCIA SCSI adapters and software drivers for the PC. Although the cards function electrically in an A600, until a company makes an Amiga driver, they do nothing except fill the PCMCIA slot.►

The A1200 and A4000 use the IDE (not SCSI) standard for connecting hard disks, and there are no IDE CD-ROM drives. (Like PCMCIA, IDE devices are often used in the PC market, meaning A1200 owners might enjoy a lower price for hard-disk expansion. The AmigaDOS software for these machines includes the software drivers for accessing these IDE devices.)

It's possible, of course, to add SCSI to the Amiga 1200 and A4000. For the A1200, you can choose between ***Great Valley Products'*** **A1200 SCSI/RAM+**, ***CSA's*** **Twelve Gauge**, ***ICD's*** **Viper**, and ***Expansion Systems'*** **DataFlyer 1200s**. Each of these boards offers a different combination of expansion options in addition to SCSI control; see "A1200 Expansion," Sep. '93, p. 20, for details.

For the Amiga 4000, ***Commodore*** introduced the **A4091**, a Zorro III board with speedy SCSI-2 and SCSI Fast interfaces that can move data at 10MB per second. At a suggested retail price of $379, it induces sticker shock for people accustomed to the relatively low-priced SCSI adapters for the Amiga 2000. (For more on the A4091, see "Mass Appeal," Sep. '93, p. 28.)



The higher price reflects the true 32-bit DMA interface and the improvements brought by SCSI-2 and SCSI-Fast. The A4091 uses an uncommon but increasingly popular high-density SCSI connector that looks like a small version of the traditional Centronics D-shape connector. (This new connector is also used on Apple's portable Macintosh Powerbook.)

Using an older SCSI adapter designed for the A2000 is not an option, either. These cards might function in the new machine, but they will not transfer data at the same speeds as they did in an Amiga 2000. The A4000 has a 32-bit data bus. Older SCSI adapters are 24-bit devices that cannot use 32-bit DMA to transfer data into memory. Instead, the cards are forced to use the CPU to transfer every byte of data from the disc. Without DMA, the transfer times could double, or worse.

Two notes of caution about using the the A4091 with the Amiga 4000: First, because of a bug in the Zorro III DMA design that went unnoticed back from the time of the Amiga 3000, A4000 models bought before July, 1993, require updating to use the A4091. *AW* reported this problem in detail just last month; refer to "Mass Appeal," Sep. '93, p. 28 for information on what to do. The other stumbling block is easier to avoid. At the lowest level, Commodore's IDE software driver is still called "scsi.device" even though it controls an IDE disk. If you add an A4091 to an Amiga 4000, the true SCSI device is known to the operating system as the "2nd.scsi.device." Aside from confusing humans, this also confuses the automatic installation of the CD-ROM driver software. After the program makes its guess at the SCSI device's name, you need to prepend the "2nd." to the device name.

In the case of the A1200 and third-party expansion boards, the new SCSI device uses the device name for the particular piece of hardware in question (e.g., GVP's "gvpscsi.device"), so there is no conflict. Just choose this device in the CD-ROM installation software, and instruct it to ignore the IDE "scsi.device."

Sharing Hardware

It's easier to justify the cost of a CD-ROM drive if you know you can share it with other computers. It's easiest to share a CD-ROM drive with a Macintosh. Today's Macs use the SCSI standard for adding peripherals.

Amiga owners may turn a jealous eye toward the inexpensive CD-ROM kits in the window of the computer store at the local mall. You can pick up a PC-compatible system for as little as $250. These low-priced units do not use SCSI, however, so they cannot be adapted to the Amiga; they use a less expensive, nonstandard interface. On the other hand, these cheap drives tend to have slow access times and consume a single expansion slot for one task. Proprietary CD-ROM drive interfaces can be found on many PC sound cards, such as Creative Lab's SoundBlaster Pro.

If you have a PC, you can add SCSI to it instead of using a proprietary interface. A SCSI adapter can co-exist with the original MFM, RLL, or IDE hard-disk controller. PC SCSI cards vary widely in price. It's generally best to pick a 16-bit card if you have a 386 or 486. Also look for an "ASPI-compliant" label, marking cards that meet an emerging standard for software drivers. (Adaptec cards have a good reputation here.) With SCSI, you can add up to seven other devices without consuming precious slots within your PC. After all these years, the MS-DOS marketplace is acknowledging the flexibility and speed of the SCSI interface.

If you buy a SCSI CD-ROM drive from a mail-order company that usually sells to Mac or PC owners, the price might include driver software. Even if you don't own a Mac or PC, don't refuse the software; you might have an opportunity to use it in the future.

It's even possible to share a CD-ROM drive on a single SCSI bus between two computers. If your PC is located near your Amiga, simply add the CD-ROM drive to the chain. If your PC is a Bridgeboard, it's obvious that your Amiga and PC are already quite close. Make sure that the CD-ROM drive is working properly on each computer alone before you try to combine the SCSI bus in this way. Also, this type of network could amplify any improper termination of the SCSI bus. Both computers can access the same disc at the same time, and with a read-only device, there's no chance that either computer will corrupt the data on the disc. CD-ROM drives work well with Mac emulators, too.

While CD-ROM will undoubtedly continue to become faster, sport new features, and offer greater versatility, the state of the art in 1993 is already well advanced. With costs far from prohibitive, this could be a good year to tap your Amiga into its mind-boggling mega-storage possibilities. ■

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CROSS-PLATFORM COMPUTING

Unlike Duke Ellington, Amiga users can't always take the A-Train. Sometimes you have to transfer to the Mac and PC lines to get your hands on the wide and varied assortment of good files shuttling around on those systems. So grab a token and latch onto a strap for a tour of interplatform data transfer.



BECAUSE NOT EVERYONE has the vision to purchase an Amiga, we visionaries have to deal with their foreign file formats when we want to commandeer a graphic, music file, font, or other piece of attractive data from the PC or the Macintosh.

Being able to use PC and Mac files on your Amiga is typically a two-step process. First, you must get the file into your Amiga; then, you have to convert it to an Amiga-compatible format. Fortunately, a large number of commercial and freeware or shareware (free/shareware) programs are available for both phases of the process.

By and large, using PC and Mac data files isn't rocket science. It just requires a little patience, the right Amiga setup, and knowledge of what programs and utilities are available to address your conversion dilemma of the moment.

What follows is a description of some of the more useful solutions to PC/Mac/Amiga data sharing, both commercial programs and free/shareware programs. The free/shareware programs are widely available on many public bulletin-board systems, as well as commercial on-line data services. Filenames on some of the major networks for each of these programs are included in the "Free/Shareware Sources" box accompanying this article. Programs are presented in the box in the order that they appear in the article. To contact developers of commercial programs mentioned in the article, consult the "Manufacturers'/Distributors' Addresses" list on p. 90.

1. IMPORTING FILES

IF YOU WANT to share data with a PC or Macintosh, the first obvious problem is getting the foreign data to your Amiga. (I told you this wouldn't be rocket science.) Short of setting up a local area network with PCs, Macs, and Amigas, there are two easy solutions.

The first is the so-called "sneakernet"; that is, swapping disks between computers. The roadblock is that all three computers have different, incompatible disk formats in their native modes. Fortunately, there are Amiga programs, utilities, and hardware that will let your Amiga read and write PC and Mac disk formats.

The second solution is a subscription to a commercial on-line service, such as BIX, CompuServe (CIS), GEnie, or Portal, from which you can download PC/Mac files directly to your Amiga. The obstacle here ►

B Y B O B L I N D S T R O M

ILLUSTRATED BY CATHERINE BENNETT

is that compression schemes uncommon to the Amiga are often used to pack Mac and PC files. However, enterprising programmers have provided us with Amiga-based programs that access and decompress those files.

Using the Sneakernet

PC COMMERCIAL PROGRAMS
CBM has made it easy to "fire up" a PC-compatible sneakernet. All AmigaDOS versions since 2.1 have included Consultron's excellent *CrossDOS*. This AmigaDOS commodity allows you to redefine your df0: and df1: Amiga disk drives as pc0: and pc1: PC-compatible drives. In short, you can write and read 360K-, 720K-, and (if you have a high-density floppy drive) 1.44MB-format PC floppy disks with your Amiga. Just insert a PC disk and you have instant sneakernet.

If you don't have or can't run the latest DOS, Consultron sells a separate version that works with earlier incarnations of AmigaDOS. Although CrossDOS is not a PC emulator or file converter (it just allows you to read and write PC disk files), Consultron bundles the program with CrossPC, a PC/XT software emulator, for $59.95.

Another PC sneakernet option is New Horizons / Central Coast Software's *DOS-2-DOS* utility ($55), which moves PC disk-based programs to and from the Amiga. While not quite as elegant as CrossDOS, it works.

Commodore's expensive *Bridgeboards* are probably overkill for the simple task of reading PC disks, but these hardware-based PC emulators do give you easy access to PC disk formats, including the addition of a 5.25-inch floppy drive. A number of other developers, including Vortex, Elite MicroComputers (EMC), Supra, and GVP, also offer hardware-based *PC emulators*. For a detailed comparison of all such boards, see "The PC Connection," Jul. '93, p. 35.)

A final tip: To insure maximum compatibility, stick with 720K PC-format disks for transferring data to an Amiga. While some newer Amiga systems are equipped with the high-density drives that read the 1.44MB disks, the vast majority of Amigas are not.

PC FREE/SHAREWARE
On the noncommercial front, check out these PC sneakernet solutions:

PC Task 2.0: This shareware is a software-based PC emulator that also reads/writes PC disks. This demo version includes registration details.

PC Patch: With functionally similar to CrossDOS, this utility is a DOS enhancement that adds PC-disk format capabilities to AmigaDOS versions 1.x.

MS-DOS to Amiga: An older Fred Fish disk utility that moves PC disk files to the Amiga.

Twin Express 1.1: Shareware that enables transmission of files between a PC and Amiga using a null modem cable connected directly to each computer's serial port.

MAC COMMERCIAL
Sneakernet choices for the Mac are more limited because it uses a multispeed floppy drive that is incompatible with the Amiga's floppy-drive controller. There are two hardware solutions to the problem: ReadySoft's *A-Max II Plus* ($499.95), which includes a controller to let Amiga drives read/write Mac format; and Utilities Unlimited's *Emplant* (from $279.95), which functions as a third-party Macintosh Bridgeboard. Generally, the best solution is to add a Mac-compatible drive to your Amiga using one of the available commercial options. To date, I am not aware of free/shareware programs that help to address Mac/Amiga disk compatibility.

Although a Mac drive will get the files to your Amiga, you may still need additional conversion software since Mac files contain extensive header information that is incomprehensible to the Amiga. Depending on the type of file you're accessing, you'll want to use one of the converter utilities listed later in this article.

A convenient solution for transferring Mac files to the Amiga is New Horizons / Central Coast Software's *Mac-2-DOS* ($99.95). The program comes with a small adapter that attaches to the Amiga's external drive port and accommodates a Mac-compatible drive. The accompanying program not only accesses the drive, but also converts a variety of Mac file formats to Amiga-compatible formats. Generally, Mac-2-DOS is the best and most cost-effective Mac/Amiga sneakernet.

To get much more than simple access to Mac disks, A-Max, A-Max II Plus, and Emplant hardware/software combinations are full-fledged emulators that permit you to run Mac software on your Amiga. A-Max provides a disk-drive port to connect a standard Apple drive. A-Max II Plus allows your Amiga's internal drives to function like Mac drives. The original A-Max (now discontinued) also can write a limited disk format that is compatible with Amiga and Mac. Unfortunately, this Mini Transfer disk format holds only 272K of information, a real pain with large files. Emplant enables you to create Mac-formatted partitions in unused Amiga hard-drive partitions (although only up to 31MB each), as well as to connect Mac hard drives to the board (formatted to their maximum capacities).

Getting Data On-Line

Disk incompatibility is swept away when you are downloading data from an electronic information service. Your Amiga will download whatever you request without regard for the computer it came from.

The problem with on-line files is data-compression technology. To maximize storage space and minimize download times, most on-line files are compressed using a variety of largely free/shareware programs. On the Amiga, the common compression programs are *Arc, LZH, LHArc*, and *Zoo*. You'll need all of these to become an expert Amiga downloader/decompressor.

Most decompression programs are easy to use from the CLI. As a convenience, however, I prefer to use them with commercial file-management programs such as Progressive Peripherals' *Disk Master II* ($69.95) or INOVAtronics' *Directory Opus* ($59.95). Both programs allow you to link data-compression programs to on-screen buttons. Click the file and then the appropriate button, and the utility automatically decompresses the program. It eliminates the tedium of typing commands in the CLI and is a real time-saver when you've just completed a marathon download session.

PC FREE/SHAREWARE
The good news is that one shareware compression program reigns on the PC—PKZip—and, happily, there is

a version of it available for the Amiga: *PKAZip*. The origins of a ZIP-ed file are transparent to the user. The Amiga version of the program effortlessly decompresses files created with the PC version. (*Editor's Note*: A newer version of PKZip for the PC (2.04) became available this year. Earlier versions of PKAZip for the Amiga cannot "unzip" files created with version 2.04. The solution? Get *infozip*, a beta release found in several areas of the public domain—see the "Sources" box. In the infozip archive are two programs, Unzip 5.1d3 and Zip 1.9L, to help you decompress later PKZip files.)

Although the PC community mainly has moved away from Arc files, they, too, can usually be decompressed with Amiga versions of Arc.

MAC FREE/SHAREWARE
The compression standard in the Mac community is Raymond Lau's Stuff-It. Programmer Peter Heinrich has created an Amiga un-stuffer, *UnStuff 2.0*. The program comes with two other utilities: CRLF, a text file converter for Mac, IBM, and Amiga; and Whackmac, a digital sound-sample converter from Mac to Amiga.

2. CONVERTING FILES

WITH A DATA file now residing on your Amiga, the next step is to read it or convert it to an Amiga-readable format. Typically, when loading PC files, no conversion is necessary. You need only use a program that can recognize the file format. Mac files, with their custom file headers, are somewhat more complicated and often require a level of file conversion before you can read them. Fortunately, many Amiga programs, particularly graphics-manipulation programs, deal with Mac-to-Amiga file-format differences transparently.

In the case of either platform, however, getting from here to there sometimes involves finding just the right conversion utility, often written by a programmer who was facing the same problem you are facing. As a result, you will find many free/shareware utilities listed here.

Text Conversion

PC FREE/SHAREWARE
The no-brainer way to ensure text compatibility is to save all files in ASCII or text-only format from within a PC or Mac word processor. Even that process will sometimes leave spurious control characters within a file. To take care of that on the PC front, here are a few PC-to-Amiga utilities to clean up the results:

Amiga Filter 2.0: Converts between AmigaDOS text and MS-DOS text formats.

Fix Text: Automatically strips spurious control characters from ASCII text files.

Bitmapped-Graphics Conversion

PC/MAC COMMERCIAL
Since bitmapped-graphics conversion is probably the most common form of cross-computer data sharing, it is no surprise that there are more and better tools for this process than for any other. The leaders in Amiga graphics processing and conversion are *Art Department Professional 2* ($299, ASDG), *ImageFX* ($249.95, GVP), and *Imagemaster 9.5* ($199.95, Black Belt Systems). All of these programs load several file formats and convert them to common Amiga IFF and other formats. When the number of colors in the source file exceeds the Amiga's limits, the programs convert to a dithered image with fewer colors, or to a 4096-color or higher HAM or AGA image. (For a complete rundown on these products see "The Great Manipulators," May '93, p. 30.)

On the PC, the most common graphics file formats are GIF, BMP, and PCX, with an occasional encounter with TIFF or Targa (TGA) files. On the Mac, PICT, Targa, and TIFF files are common, with GIF also gaining ground because of its widespread PC popularity.

The three programs support all these formats.Oddly, however, none currently offer PICT compatibility (though ADPro intends to add it). While all of these programs are good quality, ADPro is probably the best performer overall because of its copious file support and its expandable design.

Graphics Conversion

PC/MAC FREE/SHAREWARE
Several quality conversion utilities are available to process graphics from still image to PC and Mac animation/movie files:

GL Player: Plays PC-compatible GL animation/movie files on the Amiga.

Abridge: Converts several animation file formats to ANIM 5 format.

Flit: Turns PC-compatible FLI animation/movie files into ANIM-format files.

GIF to SHAM: Converts GIF graphics to SHAM format.

HAM Lab: Transforms several formats to IFF.

TIFF to IFF: Converts TIFF images to IFF files.

Wasp: This comprehensive processing utility converts between several formats, including GIF and HAM.

3-D Graphics Conversion

PC/MAC COMMERCIAL
Syndesis holds down the fort in this conversion category. *InterChange Plus* ($99.95), when enhanced with one of Syndesis's converter add-ons, provides Amiga compatibility with such 3-D file formats as AutoCAD DXF, 3D Studio, Wavefront, Topas, and Digital Arts.

PC/MAC FREE/SHAREWARE
Image PC to Amiga: Converts PC-based Imagine files to Amiga Imagine files.

MIDI and Sound Conversion

PC/MAC COMMERCIAL
Thanks to the International MIDI Association, MIDI music files have two file-format standards that are accepted throughout the industry: MIDI0 and MIDI1. They are supported by most Amiga MIDI sequencing programs and can be imported directly into them, a virtually transparent process for the user. The Mac information header, again, can confuse some programs. You should check with vendors to verify the level of ►

Mac MIDI file compatibility. (Dr. T's *KCS,* for example, easily imported a Mac MIDI file, while The Blue Ribbon Soundworks' *Bars&Pipes Professional 2.0* locked up on the same file.)

Digital sound samples are more complicated. At present, there is no standard digital sample format on any platform. The common formats are the Mac's AIFF (a variant of the Amiga's IFF sound format) and WAV files on the PC. However, perhaps due to the relatively recent appearance of the WAV format on the PC, the Amiga still lacks digital sample support for that PC sound format.

Currently, only *Synthia Professional* from The Other Guys supports cross-computer conversion, mainly from the Mac, with support for AIFF, Sound Designer, 8SVX IFF, and a few others. Contact The Other Guys for the latest list of format compatibility.

MAC FREE/SHAREWARE

MASC: Converts between Mac AIFF and Amiga IFF, including dealing with the Mac's file header.

PlayMack: Plays Macintosh sounds on the Amiga.

Sound Convert: Converts between Mac AIFF and Amiga IFF.

Font Conversion

PC/MAC COMMERCIAL

You can never have too many fonts—just too little hard-disk space to keep them. A wide variety of freeware and shareware fonts are available for PC and Mac, tempting Amiga owners to expand their desktop-publishing versatility and sacrifice mass-storage capacity.

Several commercial programs give Amiga owners the ability to load, convert and/or modify PostScript (PS) fonts for use with Amiga DTP programs. *MIFont* ($105, Mirror Image Productions) turns PS fonts into Professional Page-compatible fonts. Similarly, *SaxonScript Professional* ($130, Saxon Industries) and *TypeSmith* ($199.95, Soft-Logik) convert PS fonts into Amiga-compatible versions. (For a complete description of these and other font-processing programs, see "The *AW* Amiga Fonts Buyer's Guide—Part 1: DTP Fonts," May '93, p. 43.)

Interestingly, although the TrueType format is gaining ground on both the Mac and PC, Amiga support is still lacking for this significant outline-font technology.

MAC FREE/SHAREWARE

Mac Font: Turns Macintosh-format Adobe PS fonts into PageStream 2.0-compatible fonts.

Font Convert: Also converts Mac PS to Amiga.

Armed with file-import/conversion resources like these—and with many of them available gratis or nearly free—you'll be switching back and forth between computer platforms the way New York commuters change subway trains! ■

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FREE/SHAREWARE SOURCES

These files can be located on these networks under these names.

PROGRAM	CIS	BIX	GEnie	Portal
PCTaskV.2.0	PCDEMO.LZH	PCTASK.LZH	PCTASK200.LZH	PCTSK120.LZH
PC Patch	PCPATC.ZOO		PCPATCH2.ZOO	PCPATCH2.ZOO
MS-DOS to Amiga	MS-DOS.ARC		PC_TO_AMIGA.ARC	
Twin Express 1.1	TNXA11.LZH		TNXA11A.LZH	TWINEXP.LHA
Arc	ARC.EXE	ARC023.LHA	ARC23.ARC	ARC023.ARC
LZH	LZ.LZH	LZ192.LHA	LZ192ARPLIB.PAK	LZ192.LZH
LHArc	LHA138.RUN	LHA.EXE	LHA_E138.RUN	LHA_E138
Zoo	ZOO.LHA	ZOO.EXE	ZOO21.PAK	ZOO21.LZH
PKAZip	PKAZIP.LZH	PKAZIP1.01.LZH	PKAZIP_1.01	PKAZIP10.LZH
UnStuff2.0	UNSTF2.LZH	UNSTUFF.LZH	UNSIT_V1.5.LHA	UNSIT.ARC
AmigaFilter 2.0	AFILT2.ARC			
Fix Text	FIXTEX.ARC		IBM-AMI.ZIP	
GL Player	GL21.LHA			GL13.LZH
Abridge	ABRIDG.ZOO		ABRIDGE.LZH	
Flit	FLIT.LZH			FLIT.LZH
GIF to SHAM	GIFMAC.LZH		GIFTOHAM.LHA	
HAMLab	HAMLAB.LHA		HLP206D.LHA	HAMLABPLUS2.LHA
TIFF to IFF	TIFF2I.LZH		TIFF2IFF.LZH	TIFF2IFF.LZH
Wasp	WASP.LHA		WASP123.ZOO	WASP123.ZOO
Image PC to Amiga	IM_TRA.ZIP			
MASC	MASC.LZH		DEMAC.LHA	MASC.LZH
PlayMack	PMAC.LZH		PLAYMACK.LZH	
Sound Convert	SNDCON.ZOO		SOUNDCONVERT2.LZH	AUDIO.LZH
Mac Font	MACFON.LZH		MACFONTCONVERT.ZOO	MACFONT.LZH
Font Convert	FONTCV.LZH			FONTCONV.LZH

DOUBLE *For* NOTHING

With the help of some PD software and the following tutorial, you can network a second Amiga (or a CDTV) to your system to share programs and files on either machine.



Do you own a floppy-based Amiga 1200? Wouldn't it be nice if you could use it with the hard drive on one of your other computers, perhaps your much added-on A3000 or A500, and achieve a kind of instant 3.0/AGA upgrade with your existing system? But, what do you do if your hard drive isn't compatible with the new system? You could purchase an IDE drive for your A1200, but a more economical solution would be to share the drives of both systems via ParNET.

For those who are not familiar with ParNET, a short description is in order. ParNET is a group of programs that operate with a custom software device placed in the Workbench's Devs directory. It establishes a two-way connection between a pair of Amigas, or between an Amiga and a CDTV unit. The language of networks can be confusing and even more so when talking about ParNET. Unlike most networks where one computer is the master (server or host) and the other computers are subsidiaries (clients), ParNET operates as a peer-to-peer scheme in which both computers are treated as equals by the network software. To avoid confusion, I will refer to a host (an A3000) and a client (the A1200) in this article, even though the relationship is arbitrary in ParNET.

Making Ends Meet

You will need a custom cable that attaches to the parallel ports of the two computers. Constructing this cable sounds easy enough, but this is where most people encounter ►

BY ROB HAYS

ILLUSTRATED BY LESLIE COBER-GENTRY

difficulties. The parallel port is controlled by a chip called the Complex Interface Adapter (CIA), which is very sensitive to static electricity and can be easily damaged. If you wire the cable wrong, you might blow this chip and your computer will be useless until you replace it. After you have wired the cable, double-check each pin's connection with a continuity tester. My cost for the cable and connectors at a local electronic supply house was about $11, and it took me about an hour

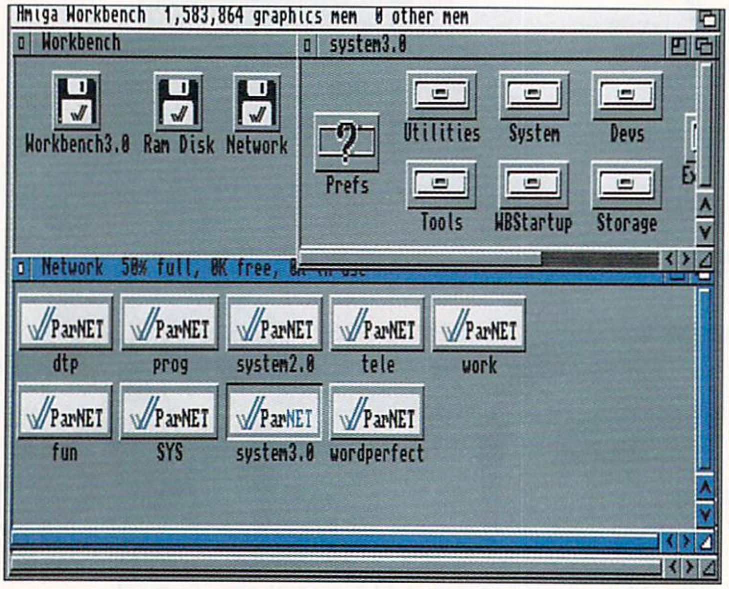
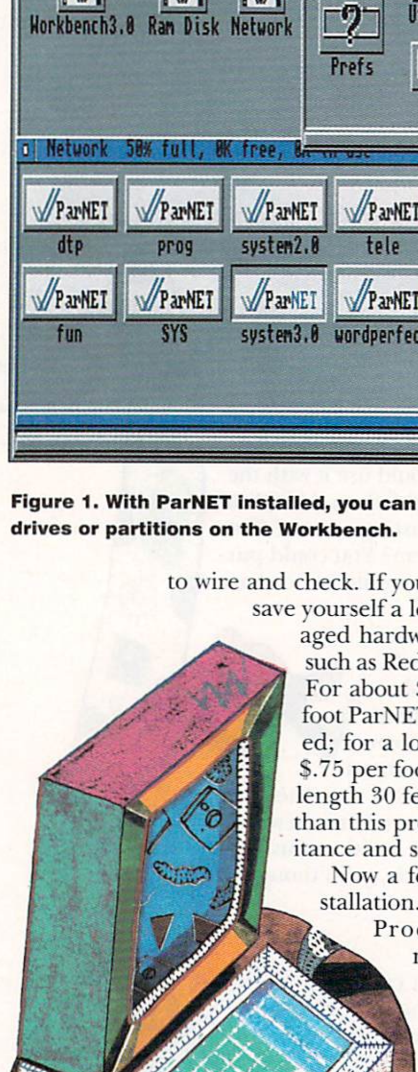


Figure 1. With ParNET installed, you can access another computer's drives or partitions on the Workbench.

to wire and check. If you are unsure of your abilities, save yourself a lot of worry and possibly damaged hardware and call a cable supplier such as Redmond Cable at 615/478-5760. For about $24 you will receive an eight-foot ParNET cable already wired and tested; for a longer cable, it's an additional $.75 per foot. You should keep the cable length 30 feet or less; if it is much longer than this problems can occur with capacitance and signal loss.



Now a few words on the software installation. Vernon Graner, a Regional Product Specialist for Commodore, wrote ParBench a series of scripts to handle the movement of files, mountlists, and devices. ParBench (on GEnie as "PARBENCH31.LHA," #18670), allows you to install everything needed for ParNET with the click of a mouse button.

If you received the ParBench package through a BBS, it probably does not include the Commodore Installer program. If you have a recent piece of software that could be installed on a hard disk, you may already own the Installer program. Look on that disk for the program, which is about 61,000 bytes long, and copy that to the C directory on your ParBench disk.

Getting Started

Now you can proceed with installing the software. While the docs included are very thorough, they can't cover all situations. The main consideration for floppy-based users is to make enough room for the net software. You should start with a fresh copy of the Workbench disk for your version of DOS, and delete the extraneous files. If you're using 1.2 through 2.0, see "The Power Of One," September '92, p. 37, for tips on optimizing your copy of Workbench. If you are using 3.0, you have a floppy-only addendum from CBM that covers this topic. In general, you want to make a disk that will allow your client system to boot to the Workbench. If you have any doubts as to whether or not it's safe to delete a file, reread the startup-sequence on your Workbench disk, and be sure to leave any files called during startup.

The software has to be installed on each computer, and the installation script will copy all of the files, including scripts for starting both host and client. To keep things simple, after installing the software, open the ParNET drawer, and on the host computer delete the script called "Boot.Client" and on the client computer delete the "Boot.Host" file. It is arbitrary which computer is booted as host or client, but you can't boot both as the host or both as the client.

When you have the net software installed and running, each computer will show a new disk icon on its Workbench labeled Network. If you double-click on this icon, you will open a window that shows a group of drawer icons representing all of the available disk drives or partitions on the other computer. If you double-click on one of these, you will see all of the drawer or program icons, just as if you were working on the other computer (see Figure 1).

ParNET is not without its quirks. For example, no disk or partition is visible to the other machine until you access it. This can be accomplished by using the CLI's CD (Current Directory) command to move to the drive or by using the ASSIGN command to name it. Also, for a drive to be visible to the Workbench, it has to have a special .info file called node.rinfo, which is included with ParBench. Place a copy of this file on every hard-disk partition you want to access over the network. Another quirk affects CLI usage; the AmigaDos command Dir won't recognize the network drives. The solution is to use the supplied public-domain command LS.

Work(bench) Assignments

If you have followed the ParBench documentation, you should now have a working, two-Amiga network. Unfortunately, it may not be as functional as you would hope. The problem comes from the way ParNET operates, acting as a file-transfer device. When you double-click on a program icon over the network, the program is copied over the network into the memory of the accessing computer, just as if it had been loaded from that computer's disk drive. For many programs, this is all that is required; some programs, however, need special fonts or libraries. When such a program starts to run on the client machine, it looks in the Fonts or Libs drawers on that computer and when it can't

find those files it aborts. The solution is the ASSIGN command.

Using ASSIGN commands entails editing of the startup-sequence. Commodore discourages changing the standard startup-sequence and has made provisions for a user-startup file in the S: drawer on Workbench 2.0 and later. On the copy of Workbench that you have installed the ParNET software on, use ED or another editor to create a file called User-Startup in the S: drawer, and type:

```
Execute DF0:ParNET/Boot.Client
```

Save this file.

This will begin the net booting process as soon as the system software is set up and ready. Next, edit the file Boot.client inside the ParNET drawer; near the end of the file, just before the line that reads

```
echo "Done."
```

add this line

```
Execute DF0:S/Assigns
```

and save the file.

Now create a new file in the S: drawer called Assigns. By editing this file, you can fine-tune the way your network operates. For guidance, check out the user-startup file on your host computer, assuming that all of the software is properly installed on the computer that you use regularly. For example, if you have CanDo (INOVAtronics) installed on a partition called Prog:, in a directory called CD, the CanDo installation added these lines to the bottom of your user-startup script:

```
Assign CanDo: Prog:
Assign CanDoExtras: Prog:CD
Assign CanDoExamples: Prog:CD
```

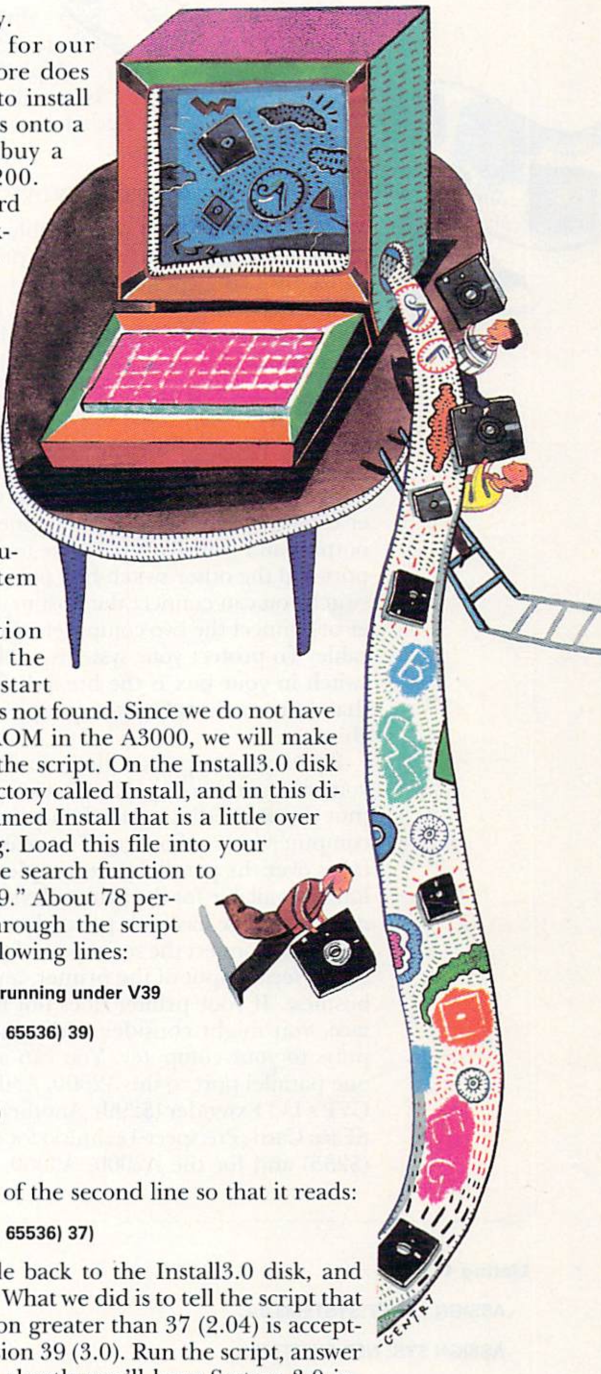
In order for the program to work properly over ParNET, you will need to alter these statements in the following way:

```
Assign CanDo: Net:Prog
Assign CanDoExtras: Net:Prog/CD
Assign CanDoExamples: Net:Prog/CD
```

These lines need to be placed in the S:Assigns file on your ParNET boot disk. Note the change in the object of the ASSIGN statement. Instead of CanDo being assigned to the Prog: logical device, it is assigned to the Prog directory on the Net: logical device. Go through the user-startup file in the S: directory on your host computer and place copies of the altered ASSIGN statements into the S:Assigns file on your client computer. This should ensure that programs you try to run over the net will find the special fonts, libraries, and so forth that they require.

Share and Share Alike

Now we come to the real objective of all this preparation: to arrange things so that the client will use the host hard drive for all of its system files. The first thing to do is to back up your hard disk, because you will have to make a new partition for the System 3.0 files. These will require a little over 2.6MB, so make your partition at least 3MB, format it, and restore your backed-up files to the other partitions, leaving the new one empty.



Unfortunately for our project, Commodore does not supply a disk to install the System 3.0 files onto a hard disk if you buy a floppy-based A1200. You can buy the hard drive upgrade package, which includes the installation disk, or you can ask your local dealer if you can copy their System 3.0 installation disk. If you can't get a copy of this disk, don't despair; you can still copy the files manually from the System 3.0 disks.

The installation script checks for the presence of Kickstart 3.0 and aborts if it is not found. Since we do not have the Kickstart 3.0 ROM in the A3000, we will make a small change in the script. On the Install3.0 disk you will find a directory called Install, and in this directory, a script named Install that is a little over 138,000 bytes long. Load this file into your editor, and use the search function to find the string "V39." About 78 percent of the way through the script you will see the following lines:

```
; make sure we are running under V39
(if (< (/ (getversion) 65536) 39)
(
    (abort #bad-kick)
))
```

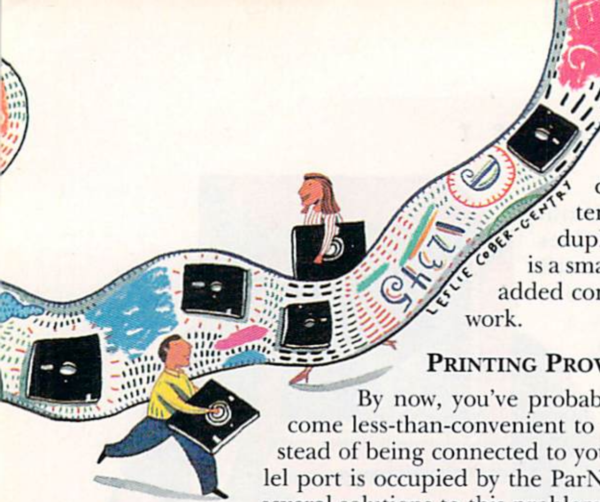
Change the end of the second line so that it reads:

```
(if (< (/ (getversion) 65536) 37)
```

Now save the file back to the Install3.0 disk, and you're in business. What we did is to tell the script that any Kickstart version greater than 37 (2.04) is acceptable instead of version 39 (3.0). Run the script, answer the questions, and shortly you'll have System 3.0 installed on your hard disk.

Once you have the System 3.0 files installed, you're almost done. Go back to your Assigns script in the S: directory of your client boot disk and add some more ASSIGN commands. These will duplicate the assignments made during the original boot process so that the client will know to look across the net for such things as Devs:, Libs:, and so on. See Listing 1 for my Assigns script for an example to follow.

You will also need to take a close look inside the L:, Libs:, and Devs: directories on your original System partition. Any specialized files you find that are required by the software you intend to run on the client machine will need to be duplicated in the appropriate ►



directories on the System 3.0 partition. The duplication of a few files is a small price to pay for the added convenience of the network.

Printing Provisions

By now, you've probably noticed it has become less-than-convenient to print something. Instead of being connected to your printer, the parallel port is occupied by the ParNET cable. There are several solutions to this problem, depending on your hardware and budget. By far the least expensive solution is to add a switch box and another cable for a cost of about $30. Get a cable with a DB-25 connector on each end with the proper gender to connect to the parallel port on the host system, and the common or input connector on the switch box. Connect the printer cable you had been using to one of the switch-box outputs and your ParNET cable to the client's parallel port and the other switch-box port. With a flick of the switch you can connect the host machine to the printer or connect the two computers through the ParNET cable. To protect your systems, make certain that the switch in your box is the break-before-make type, or that you switch only when power is off on both machines.

If you need to print a file from the client computer, you will have to copy that file to a physical disk drive (not the RAM disk), and then print it from the host computer after rebooting. The reason is that ParNET takes over the parallel port completely, so that it is no longer available for the printerdevice to use. Of course, if your printer has both parallel and serial interfaces, you could connect the serial port of the client computer to the serial input of the printer, and you would be in business. If your printer does not have a serial interface, you might consider adding serial and parallel ports to your computer. You can add two serial and one parallel port to the A2000, A3000, or A4000 with GVP's I/O Extender ($299). Another option is the MultiFace Card (Pre'spect Technics) for the A500 or A1000 ($235) and for the A2000, A3000, or A4000 ($195), which adds two serial and two parallel ports, and includes the ParNET driver.

Speed Reading

Performance is the criterion used by which you judge the results of any kind of software. So, just how fast is this network? NetStat, a piece of software included with the ParNET package, measures and displays the reads and writes over the network in bits per second (bps). Peak speeds I have seen are over 49,000 bps. For comparison, most modems operate at speeds of 2400 or 9600 bps. Loading software over the network is about as fast as a slow hard disk, which is still many times faster than any floppy. A 50,000 word document (slightly more than 277,000 bytes) requires approximately 55 seconds to load from floppy, 19.5 seconds over the network, and 7.5 seconds directly from my hard drive.

A performance boost you can add to your network system comes in the form of NetKeys, another interesting collection of software from Vernon Garner. When activated with a hot-key, this freeware package allows you to use the mouse and keyboard attached to one computer to control the other computer. For example, as you move the host's mouse, the pointer moves on the client's screen, while the pointer on the host's screen is motionless. This is extremely handy for Amiga/CDTV connections because you won't need to buy the extra keyboard and mouse for the CDTV unit. There is, however, a noticeable speed penalty incurred during this type of operation.

Certainly, ParNET will incur some minor effects on your system's performance, but the bottom line is that it can provide multi-Amiga owners with an upgrade alternative. If you want to combine the efficiency of one computer with the practicality of another, ParNET may be just what you're looking for. With the ParBench package, a minimal investment of money, and this article, you'll be networking in no time! ■

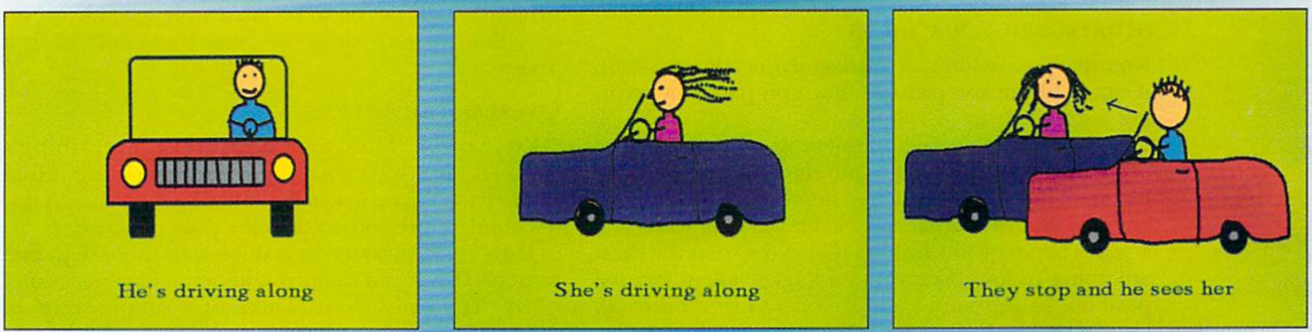
Rob Hays is a long-time multi-Amiga owner who recently set up a ParNET network that enables him to use AGA graphics modes on his A3000. Write to him c/o AmigaWorld *Editorial, 80 Elm St., Peterborough, NH 03458.*

Listing 1.

```
ASSIGN C: NET:SYSTEM3.0/C
ASSIGN SYS: NET:SYSTEM3.0
ASSIGN DEVS: NET:SYSTEM3.0/DEVS
ASSIGN LIBS: NET:SYSTEM3.0/LIBS
ASSIGN REXX: NET:SYSTEM3.0/S
ASSIGN PRINTERS: NET:SYSTEM3.0/DEVS/PRINTERS
ASSIGN KEYMAPS: NET:SYSTEM3.0/DEVS/KEYMAPS
ASSIGN LOCALE: NET:SYSTEM3.0/LOCALE
ASSIGN HELP: LOCALE:HELP DEFER
ASSIGN LIBS: NET:SYSTEM3.0/CLASSES ADD
ASSIGN FONTS: NET:SYSTEM2.0/FONTS
ASSIGN S: NET:SYSTEM3.0/S
ASSIGN DTP: NET:DTP
ASSIGN FUN: NET:FUN
ASSIGN PROG: NET:PROG
ASSIGN TELE: NET:TELE
ASSIGN WORK: NET:WORK
ASSIGN WORDPERFECT: NET:WORDPERFECT
ASSIGN WP: NET:WORDPERFECT/WP
ASSIGN PRINT: NET:WORDPERFECT/PRINT
ASSIGN CANDO: NET:PROG
ASSIGN CANDOEXTRAS: NET:PROG/CD
ASSIGN CANDOEXAMPLES: NET:PROG/CD
ASSIGN CGFONTS: NET:DTP/PPAGE4.0/CGFONTS
```

Prepping for VIDEO

A little well-planned preparation for your shoot will not only make for a better quality video, but it will also save you lots of aggravation. Study the tips in this checklist—before you head down the road.



MAKING VIDEOS CAN be fun, but with a little preparation, you can create productions that are truly satisfying and professional looking. Let me outline a few points you should keep in mind when planning your next video.

Get It Down on Paper

Writing is a very personal process, so I'm not going to tell you *how* you should write your script. Remember, however, that no matter what kind of production you have in mind, there are some basic questions you should ask yourself before you even sit down to write a script. Who is your audience? What is your budget? How much time can you devote to this project? What are you trying to achieve? Answering these questions realistically up front can save you a lot of hassles later on.

Regardless of its content, the normal format for a video script uses the "two-column" approach: One column is for the audio, and the other is for the video (all pictures and effects/transitions). Some people prefer to include music and sound effects in the audio column, while others like to keep them separate from the spoken words. When possible, I prefer to keep my music cues somewhere in the middle.

The reason for a two-column script is simple—it's easy to follow. By breaking things down into two columns, your in-points and out-points and your audio and music cues are much easier to find. Imagine trying to find time code on a single-spaced typed page. Then imagine doing this over and over again in the course of an edit session. Talk about headaches!

There aren't many word-processing programs available that provide for two-column scripting. ProWrite (New ►

BY CHRIS CONROY

Horizons Software) does support two columns, but the columns wrap from the left side of the page to the right so that your audio may wind up in your video. I find this too difficult to work with. Instead, I print the script out in the right-hand column and write the video directions in by hand on the left. I find that I make so many changes along the way that this is the simplest method to use.

Scout It Out

Once your script is complete, it's time to think about where you're going to do your shooting.

Where will you be shooting your production? In your basement? On the beach? Your buddy's car? Scout out the location where you'll be doing your shooting. Walk around and pretend you are the camera. Or if you can, bring the camera. Look through the viewfinder and check out your surroundings. What do you see? What's in the background? Will the background be distracting? Would a better shot result if you faced the other direction? What about angles—low-angle shots, high-angle shots? What's the light like? Is there enough room? Can you fit the camera and your body into that corner and still get a decent shot? Scouting out a location may seem like a waste of time, but it can save a lot of "cover-up" later on.

Storyboard Your Shots

Now that you've found a satisfactory location to shoot, it's time to put the pictures down on paper by creating a storyboard.

A storyboard can be a lifesaver. It can be a tedious process (especially if you're purely a stick-figure artist like me), but it is essential. A storyboard is a series of pictures that show what you will be shooting when you actually begin production. You plan out what the shots are going to look like: camera angles, talent (actors) position, backgrounds, and so forth. A storyboard allows you to visualize what the final project will look like. The idea is to eliminate the number of surprises that can pop up (and they will, believe me!) when you begin to shoot. A storyboard can help you decide what transitions to use from one image to another (a dissolve, a wipe, some funky tumbling effect) and what order to put them in.

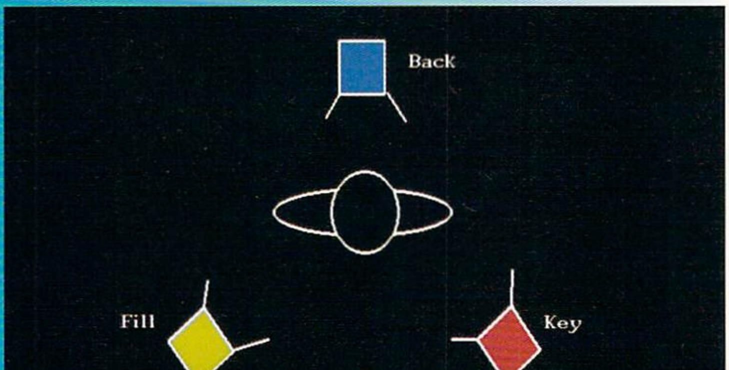


Figure 1. A basic three-point lighting setup.

The sequence on the opening page of this article is an example of a very basic storyboard from a commercial I did for a local Jeep dealer. It's a simple commercial, and so is the storyboard (just look at that artwork!), but it saved me time in the field. Simply by laying out what shots I wanted and where to shoot them, I was able to figure out just what I needed: two jeeps, each with a driver, one male and one female. Simple enough. But I also needed a vehicle that I could shoot from while the two jeeps were being driven, and an area where I could drive safely without endangering the crew and vehicles.

I was also able to see exactly what graphics I needed, where they should go, and how they should look. I already had some music in mind, but seeing how quickly the shots followed each other helped to narrow down my choices.

Storyboarding is one area where the Amiga really can be handy. Thanks to the ability of most word processors to import graphics, you can place your images and text side by side for easy reference. DeluxePaint IV (Electronic Arts)—or most any other paint program—allows you to create simple graphic representations of your shots. Revising them later on is a breeze.

Overlap the Action

Okay, you've done your homework, everything's planned, and you're itching to start shooting. Hold on! Let's look at a few techniques that you should understand before you go out take your pictures.

Most video production is done with more than one camera. If you can't afford additional cameras, don't worry: You can fake it. Think of a simple scene in which a salesman is trying to make a sale. He knocks on the door, the customer answers the door, they talk, and he leaves. If everything was shot with one camera from the same position, this would be a very boring exchange. But by moving the camera to different positions and then editing at the right points, you can help the action flow.

Overlapping the action is a technique that can really change the look of your work. It requires that you shoot the scene with the technique in mind. In our salesman example, if you shoot the scene from more than one angle, you'll get both sides of the conversation. It will allow you to show facial expressions and give the scene a much better flow. First we'll look at how to set up the shots, and then we'll see how to edit the sequence.

The storyboard for this example would show six different shots: (shot #1) the salesman approaches the door; (shot #2) the customer answers the door; (shot #3) the salesman makes his pitch; (shot #4) the customer responds; (shot #5) the customer starts closing the door; and (shot #6) the door is slammed in the salesman's face.

In order for these shots to work, we have to make sure the action overlaps. To achieve this, simply shoot the entire scene from each of the different angles. In this simple example, there are only two different camera angles in the scene (over the salesman's shoulder

and over the customer's shoulder). Shoot the scene all the way through twice—once from each different angle. You could shoot each shot individually, moving back and forth between camera angles, but going through the entire scene allows the talent to act more naturally because the action is not interrupted.

In order for the sequence to work, it's very important to make sure that the actions from each angle match. You don't want the salesman holding his briefcase in his hand from one angle, and then having him clutching it at his side in the next. Whatever the talent does from one angle, they must also do it from the other.

Now that you've shot the scene with this in mind, editing it should be simple. To get from shot #1 to shot #2, you would cut when the customer is opening the door. To get from shot #2 to shot #3, you could either cut as the salesman starts speaking or cut to the shot a little earlier and get the salesman's reaction to the person who has opened the door. Editing is really a matter of feel, and as you do more of it, you will get a sense of what works and what doesn't.

Before we leave the subject of shooting and camera work, here are some other tips to keep in mind when you do actually get out on the shoot:

Make sure that you hold your shots steady for at least 10 seconds. Sometimes you just need that extra amount of time. If the shot is too short, you may have to toss it.

If you're panning or zooming, hold the shot static for 10 seconds before zooming or panning and for 10 seconds after. This gives you room at the head and tail of the shot (in case you need to fill time).

Make sure that you get a wide shot (or establishing shot) of the area that you're shooting. You may be able to use this shot in place of another if something unexpected comes up. It's good to get a shot to cover things—you never know when you're going to need it.

Light It Right

Now you know what you want to shoot, where you're going to shoot it, and what you want it to look like. Let's talk a little about lighting. Essentially, lighting is everything in video because what we see is actually light being reflected off objects (people, buildings, and so on). The way a scene is lit can make or break a video.

The tried-and-true method of lighting is called three-point lighting because is uses three different light sources: key light, fill light, and back light. Figure 1 shows a basic three-point lighting setup.

The key light is the main light source. It will illuminate the subject and the subject's immediate surroundings. The fill light is used to "fill-in," that is, to light the areas that the key light has missed. It is generally used to soften deep shadows and highlights. The backlight is used to add depth to the shot. By rimming the back of the subject with light, your subject appears to stand apart from the background.

The key and fill lights are normally placed at about a 45-degree angle from the the subject on either side of the camera. The back light should be placed behind the subject slightly off to the same side as the fill light. Three-point lighting is an easy and effective way to light a subject and/or scene. Use this technique as a base for all your lighting.

Most light coming directly from a light source will be harsh, which creates strong shadows. This is not necessarily bad, but if you want to create a softer look with your lighting, diffusing the light makes everything look softer. It appears as if the light is coming from all around rather than from one specific point. Instead of giving you strong, well-focused light with strong shadows, diffused light provides even illumination with very little shadow.

There are many ways to diffuse your light. One of the more common is to use a frosted gel. A gel (or any other type of diffusing material—ask your video dealer for advice) is usually placed in front of the light in a frame or a clip, or held in place with good-old clothespins.

Reflection is another simple way to diffuse your light. Many professional lighting kits come with relfective umbrellas that soften the light considerably. You can get by without an umbrella by bouncing your light, say, off the ceiling or a wall. This works well if you have only one light mounted on top of your camera. It will provide you with nice, soft, general illumination. Keep in mind, however, that when you diffuse a light source you cut down the amount of light that it gives off.

Don't think of lighting as a headache that you have to deal with every time you shoot. Consider it as another tool that you can use to create a distinctive look.

Be Ready to Improvise

Okay, the big day has arrived. You have your script, your storyboard, and your equipment and crew. Your first two shots go exactly as you planned. Scouting out the location and following the storyboard are really paying off. You're way ahead of schedule, and you may even have time for lunch! Then reality rears its head. Something you didn't plan for happens and you can't follow your script and storyboard exactly.

Relax. Be flexible. Have fun with it. This is just a part of the process. If a certain idea you had doesn't work out—and it does happen—then try something else. If you are willing and ready to do a little revising on the fly, chances are you can work around your little glitch and get back to your original plan within a couple of shots. Your initial preparation will have provided you with a good idea of what you need.

The need to make changes also may arise under more fortuitous circumstances. Things may be moving along incredibly well and while you're shooting, you notice a camera angle that you hadn't thought of before. Go for it! Who says you can't have more than one take of a particular scene. I recommend trying two or three different takes of certain scenes. Sometimes things may work out better than you envisioned. You don't want to be back editing the piece and then say, "Gee, I wish I'd shot that other take as well."

Creating a good-looking video—a project that you're proud of—takes a lot of work. But if you prepare, know what to expect, and also anticipate the unexpected, the results will be worth it. ■

Chris Conroy is Production Coordinator for the Massachusetts Institute of Technology's video-production department. Write to him c/o AmigaWorld *Editorial, 80 Elm St., Peterborough, NH 03458.*

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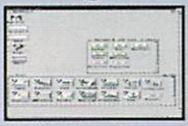
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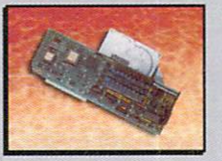
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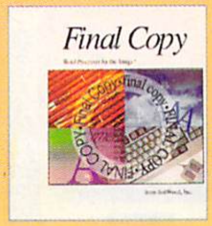
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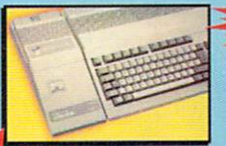
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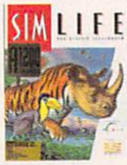
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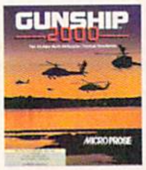
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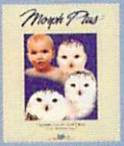
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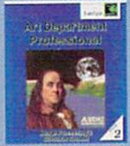
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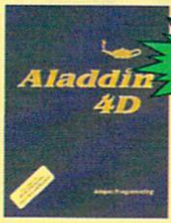
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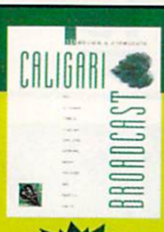
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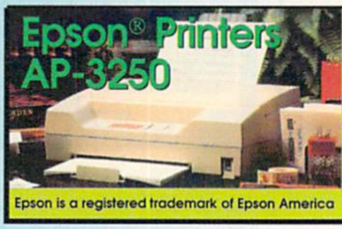
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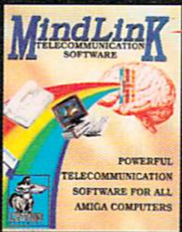


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ACCENT ON GRAPHICS

24-bit Painting

56

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

IF THERE ARE universal wishes among Amiga artists, one is probably for more color and higher resolution. The new AGA chip set goes part way toward granting that wish, and HAM8 mode does have some unique advantages over any other color system. The standard of high-resolution color, however, is the 24-bit universe of 16 million displayable colors. Ironically, the Amiga has not yet integrated 24-bit display into its operating environment as effectively as have the Mac and IBM PC platforms, but very good boards and software do exist that allow the Amiga artist to function at the 24-bit level. For painting, one of the best options available is Centaur's OpalPaint.

OpalPaint is included with the same company's OpalVision board. OpalPaint installs to your hard drive from floppies, making it easy to upgrade. The board itself is installed in your Amiga and allows the computer to display 24-bit color. While a majority of readers may not have the Centaur package, you may find the typical OpalPaint session presented below a useful way to explore the whole concept of 24-bit painting. Also, the OpalVision board can be addressed by other programs, as well. Art Department Professional and MorphPlus (ASDG), ImageFX (GVP), Aladdin 4D (Adspec), and Imagemaster RT (about to be released by Black Belt as of this writing) render an image to the OpalVision display for 24-bit viewing.

The World of True Color

The power of 24-bit color lies in its capacity to represent flawless continuous modeling of color, value, and transparency over forms. For example, to see the dramatic difference between HAM and 24-bit color, load a Backdrop in ADPro, setting the four corners to different colors. Render the screen in HAM with no dither and the geometric pattern of hard-edged colors reveals the limitations of a 4096-color universe. The computer is trying to represent a smooth gradient and can't. While dithering can eliminate the edges, it winds up substituting a spattered granularity. Render the image with ADPro's OpalVision Saver, however, and you see a flawless gradient.

The overall approach to the accompanying illustration was to build the foundation of the image in layers, then finish the surface with airbrush details and image-processing tools. A full-screen horizontal gradient fill served as an underpainting. OpalPaint allows you to set complex color gradients and to create associated transparency gradients, as well. The transparency gradient allowed an area to be left dark where the woman's face would be added later. OpalPaint allows you to work on an image larger than the screen. Thus filling the screen in gradient mode will not necessarily fill the image area. One solution is to use Zap from the Extras menu. This applies any selected effect to the entire image. If limited RAM is a barrier to creating large images, you may be able to work around that by using OpalPaint's virtual-memory option, which lets the program use available hard-drive space in place of RAM.

The woman's face was loaded to a spare screen and Zapped to the main image using Rub Through at 50% transparency. I had started that face long ago in DeluxePaint (Electronic Arts) in 16 colors, but now it could be recycled as part of a more complex piece. I scanned the small skulls from an acrylic painting of mine. They were used partly for their visual content and partly to experiment with a variety of image sources. Rub Through was used in Relative mode to duplicate one skull to a new location.

The main image was specified as both source and destination for a Rub Through. By selecting Relative instead of Absolute, I could specify an origin point of the skull on the source image. Painting in the desired new location with transparency copied that skull faintly to the new spot. The skulls were

Using 24-bit painting programs like OpalPaint, you can achieve high-resolution color results just not possible with other tools.

integrated into the painting with the Smear Mode, F4, which softly blends colors under a moving brush. Note that wherever possible, OpalPaint retains the DPaint keyboard commands. That so many paint programs do so is a graceful testament to the classic status of DeluxePaint and is much appreciated by long-time Amiga artists.

A Wide Range of Tools, Too

The figure on the right of the illustration was painted directly to the image using the Chalk tool. Chalk produces strokes with the interesting character of "real" material. You can even specify different paper textures under the stroke. OpalPaint's Dynamic Undo allows you to paint with the left button, then "carve" away with the right button to shape an area without affecting the background. Using Airbrush and Blur finished the figure. A grid motif was beginning to appear, so I applied rectangular area fills at different transparencies to break up the image into blocks and add color. You may find that thumbing through the Drawing Mode descriptions in the excellent manual will inspire new experiments. For instance, drawing in Mosaic mode added blocky texture to some areas of the painting. Choices range from familiar drawing and painting modes to a wide range of image-processing operations.

Any effect can be applied selectively to defined areas of an image. You can use the standard shape or freehand tools to define an area, but one of the most powerful tools is the Magic Wand. This allows you to click on a point in an image and have the software analyze the surrounding area. Any adjacent pixels that fall within your defined tolerance range will be selected. A second click then causes whatever effects you have chosen to be applied to that area. A slider allows you to tune the tolerance of the Wand to include colors close to, but not identical to the color of the pixel you select.

With a little practice this becomes a useful and accurate way to define an area. Here is a tip for estimating the proper tolerance level. Switch to the Extras menu to see a feedback display of the RGB and HSV levels under your moving cursor. Hold down the Alt key and these values become cumulative. In other words, you can carefully move the cursor over areas of the region that you want included and maximum values encountered remain displayed. Use those values to set the tolerance sliders for the Magic Wand. In the illustration, the Wand was used many times to create stencils, darken a complex shape, colorize the background, and so on.



The 24-bit painting above, "Chain of Perception," uses a variety of OpalPaint's tools and image-processing options.

Brilliance mode and the adjustable Grid allowed bright lines to be laid over the chalk figure. Finishing touches were added with the airbrush tool using various application weights. Painting in the 24-bit mode allowed repeated reworking of the image without either the accumulation of artifacting that can characterize HAM painting, or the granular dithering that characterizes eight-bit or indexed color representation. OpalPaint's "real material" tools and paper textures allow an artist to simulate familiar painting and drawing methods while the range of image-processing tools extend creative freedom. ■

Joel Hagen's credits include work in art, astronomy, science fiction, and software development. Write to him at 10512 Sawyer, Oakdale, CA 95361. Please include a stamped, self-addressed envelope for a reply.

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Buy the Best… For Less!

Not only do you save a lot of money buying used pro video equipment, but you also often wind up with gear that's "better" than new.

By Paulo de Andrade

MAYBE SEEING THAT $2400 price tag on a Video Toaster is pushing you to try your hand at becoming a desktop-video producer or professional computer animator. After all, the latest NewTek video states that the board replaces more than $300,000 worth of broadcast equipment (although that figure is a vast overstatment). But what happens if you buy a Toaster and find out that you just can't use your trusted VHS decks with it? Or, if you intend to record high-quality animations, you discover that a VTR capable of single-frame recording is required?

What NewTek doesn't say in its Toaster promotions is that to be able to do the kinds of things shown on its demo tapes, you need a lot of professional video equipment. And when you find a professional equipment dealer and discover how much an entry-level system costs, suddenly you have an acute attack of "budgetitis."

Investing a lot of money in video equipment can be a big risk, especially if you are just starting in this business and don't have a big client base. There is a way, however, to get the gear you need for a fraction of the retail price. The answer is used pro equipment.

Why Pro Is Affordable

The television and professional video-production industries are very dynamic. Every year there are new products that either make the existing gear obsolete or have that single extra feature that everyone has been waiting for. Because the competition can be very fierce, it is common to see post-production facilities practically giving away their used equipment in order to have the new stuff before their competitors. The result is a lot of available high-end video equipment at excellent prices.

Buying used pro gear is not only a good way to be able to afford the equipment you need, but it also allows you to get your hands on much better gear than some of the latest consumer equipment available at higher prices.

In video, it is very important to buy the best equipment you can afford. After all, the better the gear, the better the pictures you will get. The beauty of used pro equipment is that you will be buying today what was network-quality equipment yesterday. The best used pro gear still delivers incredible quality, sometimes equal to that of brand-new equipment. Choosing what to buy is not easy, as there are quite a number of video formats in use (see "Video Suite," Nov. '92, p. 60, for more on formats)—some true broadcast-quality and some not. Let's start by taking a look at what you can buy in terms of VTRs.

VTRs: Wide Choice, Good Prices

Just a few years ago, before the advent of digital VTRs, one-inch format used to be the best video available. To this day, it still delivers top quality for analog video and it is used by TV stations all over the country. The price for this kind of quality used to be very high—from $45,000 to $100,000 per complete VTR. But a quick look at the pro video classifieds reveals some incredible bargains. (The prices I quote for used equipment in this article are taken from a recent sampling of classifieds in video publications.) Take an Ampex VPR2 VTR for just $5000! While this is less than a new S-VHS edit deck, this one-inch machine delivers a much better picture and is true broadcast-quality. For the same price you can also find a Sony BVH 1100, a real industry workhorse. Both these decks are editing VTRs and are capable of single-frame recording.

One thing to be careful about when buying one-inch VTRs is that you should look for machines that play and record in the "C" format. These are usually called "type C" VTRs, which became the standard several years ago after a format war with "type B" decks.

Betacam was the first popular 1/2-inch broadcast format. It was replaced by Betacam SP, which delivers an even better picture. However, the original Betacam is quite good, still much better than S-VHS, and it's still being used by many TV stations. MII is another high-quality 1/2-inch broadcast format used by television networks and many high-end production facilities. When new, VTRs of these formats used to cost around $35,000. But these days you can get a used portable Sony BVW 25 Betacam that can be connected to any camera for just $3000, or a Sony BVW 40 Betacam edit deck for around $7500. If you would like a variable speed MII edit deck—capable of very stable slow-motion or fast playback—$6500 will buy you a used Panasonic AU-650. And for just $4800 you can get a JVC KR-M800U MII edit deck. Again, all of these VTRs will deliver true broadcast-quality pictures, and the edit decks are capable of single-frame recording. ►



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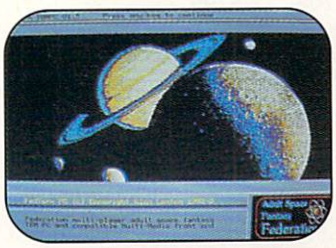
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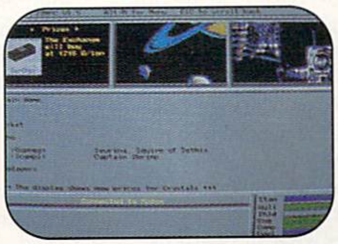
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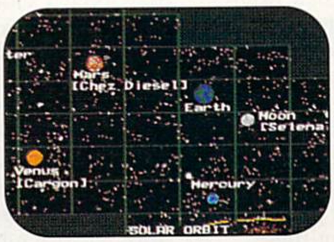
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The 3/4-inch video format, commonly known as U-Matic, has been around for several years. While it used to be considered broadcast-quality, it lost this classification to the 1/2-inch formats mentioned above. Yet 3/4-inch has a huge base of machines still in operation, and it is not only used by many corporate facilities, but also by numerous small television stations and cable companies. The best 3/4-inch decks deliver perfect image quality for corporate/industrial applications or even local commercials. Three-quarter-inch SP decks deliver slightly improved picture quality.

When new, 3/4-inch edit decks used to cost from $10,000 for the industrial units to more than $20,000 for the broadcast VTRs. Used 3/4-inch decks, however, are a lot cheaper than new S-VHS decks and may deliver comparable pictures (some people swear they are better). You can buy a very reliable, former broadcast-quality Sony BVU 800 3/4-inch edit deck for only $3000. This VTR was built like a tank, designed to withstand the rigors of nonstop editing. For $2400 you can find a Sony VO 8800 portable 3/4-inch SP deck, with time code, that you can attach to any camera. A portable Sony BVU 110 3/4-inch VTR can be found for as little as $500. And, for under $5000—less than the price of a top-of-the-line new S-VHS deck—you can buy a complete 3/4-inch edit system consisting of a Sony VO 5850 edit VTR, VO 5800 player, and RM-440 edit controller.

Super-VHS (S-VHS) is a relatively young and popular format, and thus the savings on used S-VHS gear are not as dramatic as with older equipment. But you can still find some used S-VHS gear for less than half the price of new units. A Panasonic AG 7500A edit deck goes for less than $2800, while a JVC BR S 811 edit VTR can be bought for less than $3000. A Panasonic AG 7400 portable with extras costs around $1400.

Cameras: Focus In on Savings

You can expect the same kind of savings you get on VTRs when you buy a used pro camera. Actually, you may be able to find certain television cameras for as little as one-seventh their original cost. A big advantage when you buy a used high-end broadcast camera is that you get ultra-quality lenses that are usually worth several times the price of the whole package. It is also common to see used cameras bundled with tripods and other accessories.

The earlier cameras used picture tubes as imaging devices, but these were gradually replaced by chips. Because chip cameras are relatively new, you will find a good assortment of tube cameras on the used market. This is not necessarily bad, as most broadcast-quality tube cameras perform better than new industrial-grade chip cameras. There are, however, a few problems with tube cameras, such as picture burn-in when they are pointed directly at strong lights and fairly frequent alignment adjustments.

Camera prices and models seem to be more varied than with VTRs, so I will cite just a few examples to give you an idea of what you may find. Only three-chip or three-tube cameras are considered, as these offer true professional quality. One tube camera, the Ikegami ITC-730—with a 15x Canon high-grade lens and other accessories—can be had for only $1900 used. A current Panasonic 300 CLE chip camera with lens goes for less than $5000. A Sony DXC-M3A tube camera is a common find for less than $1500, with lens. The newer Sony DXC-M7 chip camera costs around $4500, while a broadcast-level Ikegami HL 791 goes for around $5500.

Miscellaneous Gear: A Mixed Bag of Bargains

In some cases, you can also save money by buying second hand other pieces of equipment you will need to complete your system. Switchers, monitors, audio mixers, TBCs, microphones, tripods, single-frame controllers, edit controllers, and DVEs are all available on the resale market. However, due to recent technological advances, certain used equipment may cost more than today's newer models. TBCs (time-base correctors) are a case in point. When digital TBCs became available, broadcast-quality units used to cost as much as $20,000. Recent TBCs on cards that you plug into your Amiga now cost less than a tenth of that price. So, you may find that even used, stand-alone TBCs are quite expensive. If you want to buy used, look for TBC cards. Although they may be harder to find, it is common to see them for less than $500. Video switchers also used to be expensive, with very few models costing less than today's Video Toaster, while offering only a fraction of its features.

Some items, however, do offer great savings, such as audio mixers, edit controllers, tripods, and microphones. These units haven't changed much over the past few years and don't suffer a lot of wear. Monitors, although there are bargains to be had, are a different story. Picture tubes wear out with use and tend to lose their sharpness. Only buy used monitors when you know that they have not been used much or if they have been serviced recently. Otherwise, save your money and buy new. The same applies to test equipment, such as waveform monitors and vectorscopes. They are only useful if properly calibrated and with sharp tubes.

How to Look, Where to Look

Buying used video equipment of any kind requires caution. Even such items as VTRs and cameras do wear out and go out of alignment, requiring frequent maintenance. And since servicing pro video gear is expensive, you want to make especially sure that the equipment you buy is in good operating condition. If you don't know what to look for in used equipment to make sure it is in good shape, there are some ways to increase the odds in your favor. One trick is to buy equipment that is currently in use. Not only will you be able to see it in operation, but also the fact that it is being used usually means that it is in good working condition. Many production facilities follow rigid maintenance schedules and will use only equipment in top shape.

If you are not sure about the condition of the equipment, or if you live too far away to check it out personally, you can hire a television engineer to test the gear for you. This is not a very cheap service, but I consider it a very wise investment if your purchase involves serious money. Another way to be safe is to buy from used equipment brokers. They are usually honest and will test the equipment before selling it.

You can find used pro video gear advertised in your local newspaper, but you will find a much larger selection if you look at the classifieds sections of specialized trade magazines such as *TV Technology, Video Systems, Post, AV Video, Videomaker,* and *Videography*. Most of these are commonly available on the newsstand or at retail shops specializing in video equipment. Also, check out the National Amiga Exchange in Chantilly, VA (voice 703/620-9499); they may have some video-related equipment. They will fax you listings if you have a fax machine with "polling" abilities: 703/222-8799.

Buying used professional video equipment may be the ticket to the system of your dreams—without getting into serious debt. ■

Paulo de Andrade is president of Kinema Graphics, an Amiga/Toaster-based broadcast-video and 3-D animation production company in Seattle.



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From p. 23.

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Unquestionably, the best part of any business venture is being paid, but for this to happen, most companies require you to submit an invoice. This is where your Amiga and Legendary Design Technologies' Invoice-It! come in handy.

The second in a planned series of Amiga business applications from Legendary, Invoice-It! does for invoices and price quotations what the company's earlier Address-It! did for mailing labels. It's a clean, intuitive way to produce professional-looking invoices and to make sure your customers are paying as they should.

Check's in the Mail

Invoice-It! follows Address-It!'s lead in providing commonly used headings—such as Bill To and Ship Via—with gadgets that bring up requesters when clicked. This significantly reduces the time needed to complete invoices. The main screen is a representation of an invoice, along with a row of buttons lining the bottom for point-and-click access to common tasks that include recalculation, printing, saving, paying, and voiding. Virtually every function or menu choice has a keyboard equivalent, which makes for fast access.

Invoice-It! also displays or prints eight different types of reports. These include Invoice and Accounts Receivable details and summaries, a trend report, and a register of current invoices. You can base these reports on all invoices or only on unpaid invoices, which makes it easier to see at a glance who hasn't paid yet. If you need to find a specific item, you can search by invoice number or by a string of text from the Bill To or Ship To fields. Unfortunately, you can't search for a numeric amount, such as an invoice whose total was, say, $115.

Two versions of the program are included on the distribution disk, one for 512K users and another for those having a megabyte or more of RAM. The differences are in the maximum number of customers and reports supported—1000 with the 512K version and 5000 with 1MB. There is a maximum reporting period of 20 years for both versions.

Carry the Nought

When initially configuring Invoice-It!, you can set up two different tax rates—state and city, for instance. Canadian residents can also have their taxes compound or not, according to the specifications of their local tax laws. You can have the tax structure default to applying either tax, both taxes, or neither to your sales, and you can change this for individual invoices. You can even tell Invoice-It! to round off fractional amounts to the nearest penny.

If you already have a file of customers for whom you would like to use Invoice-It!, a conversion program is included. This reads an ASCII file and generates a file that Invoice-It! can use. The manual includes details on the format for the ASCII file. Also included is a program that attempts to reconstruct the all-important index file if things go awry. As with all critical files, however, the best insurance is frequent backups.

Of course, not everyone needs the same information on an invoice, so Invoice-It! includes a layout editor and some sample form layouts. This allows you to specify which fields to include, their sizes, placement, text styles, and more. Note that this layout has nothing to do with the on-screen representation of your data, just the printed format.

Unfortunately, the manual fails to make clear that before you can print an invoice, you must first enter the layout editor, load your preferred layout, and then return to the main screen to select the invoice(s) you want printed. The first version of the program I received, 1.0, gave no clue as to why nothing printed. An update, 1.0A, now pops up an alert box telling you no layout has been loaded when you try to print without one. Also, if your Amiga has a 68030 or 68040 accelerator, make sure that you have version 1.0A by checking the read-me file on the disk. The first version crashed whenever I selected the built-in calculator function on these processors; the new one works without a hitch.

Fudging Numbers

Invoice-It! is a versatile, easy-to-use program, yet there are some glaring deficiencies. In the layout editor, while you can choose from the supplied list the fields you want to include, you cannot define your own fields, nor can you change the relationship between fields. For example, in my business I bill for parts and labor, with the total being the sum of these. Invoice-It! lets you put different titles on the fields, but the Extended column will always be quantity times unit price.

A second shortcoming is that there is no way to produce a statement of account based on the invoices and payments received. Granted, you can include on your layout what is termed a mini-statement, which consists of a customer's current balance, as well as any balance 30, 60, and 90 days old. All of the needed information is in the file; there just isn't any way to print it in statement form.

Legendary has recently released an improved version of Address-It!, and I'm confident that the company will continue to improve Invoice-It! as well. This is already an excellent program if your work is within the framework used. With minimal enhancements, this could be an outstanding and versatile program.

—Rob Hays

Trifecta 2000; Trifecta 500

ICD, Trifecta 2000EC (IDE version, $159.95), 2000LX (SCSI version, $199.95); Trifecta 500EC (IDE version, $199.95), 500LX (SCSI version, $249.95).

Amiga 2000/500.
1.3/2.0 compatible.
Amiga 500: External, expansion-port connection.
Amiga 2000: Internal, coprocessor slot.
Installation: Easy.

Hard-drive controller and RAM expander.

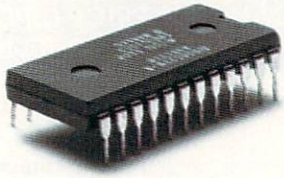
Now that the Amiga 2000 and 500 have been forced into early retirement by the A4000 and A1200, owners of the older machines are becoming increasingly concerned as to whether development will continue for these "classic" Amigas. You should be delighted to hear that ICD has introduced a new line of peripherals made especially for these machines. The Trifecta is a combination hard-drive controller and RAM expander, with versions for both the A2000 and A500.

Altered Chassis

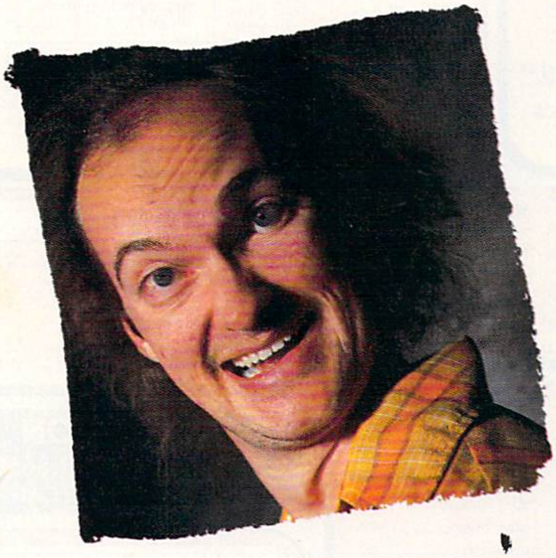
A few physical differences necessarily distinguish the two versions. The Trifecta 2000, a plug-in card, has space to mount a standard 3.5-inch or 2.5-inch hard drive in a hard-card configuration. Its counterpart 500 model comes in an attractive external case that slides into the side of the Amiga 500 and provides its own external power supply. Functionally, however, the two models are similar.

Both come with an IDE interface for use with those inexpensive hard drives

Continued on p.65



THIS OPPONENT IS PROGRAMMED TO BE CHALLENGING.



this one wants to rip your lungs out.

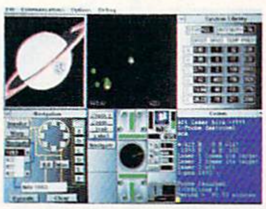
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From p. 62.
that have become increasingly popular in the PC market. Both have sockets for up to 8MB of 16-bit expansion RAM, using the same 1Mx4 ZIP chips as the Amiga 3000. You can add memory in increments of four chips (2MB) at a time, which is not only economical, but also allows you to achieve the obscure 6MB configuration, the maximum amount of RAM for Bridgeboard-equipped systems.

In addition to the basic model, there is an optional "LX" version that includes a high-speed SCSI-2 interface. You can either buy the LX version to begin with or upgrade the basic EC version when time and finances allow. Since the upgrade consists merely of plugging in a couple of chips, it's an easy process.

Preparatory Steps

If you purchase the Trifecta as a bare unit (which is commonly the case), the installation procedure includes adding a hard drive and, usually, additional RAM. The procedure for installing a drive on either Trifecta is easy and much the same for both, except that with the Trifecta 500, you must first take out a single screw and remove its cover, which is about as simple as things get when it comes to expansion boxes.

You plug in the power and logic cables (cables for 3.5-inch drives are included, but a 2.5-inch IDE drive cable is optional) and attach the drive with four small screws. Adding additional RAM entails plugging in the desired number of ZIP chips and setting the jumpers to correspond with the amount of RAM in use. To complete the A2000 assembly, just plug the expansion card into a free slot; in the case of the A500, slide the expansion box into the computer's side.

Both boards also have configuration jumpers that set the SCSI ID of the host controller, set a boot delay for drives that are slow to spin up, disable the 64K drive buffer that the board claims from system memory, and enable a compatibility setting for ICD's AdSpeed accelerator board. The Trifecta 500 comes with switches for turning off the memory and hard drive, while the 2000 board has jumper pads to which you can connect your own hardware switches. I had trouble remembering the correct switch positions on the 500 model, since one is up and the other down. After much hunting, I found the settings in the manual, but it would be much handier if the "enable" and "disable" positions were labeled on the case.

A unique feature of the 500 model is the "mini-slot," which sticks up from the board. While the connector for this expansion port is the same as that for a normal Amiga expansion slot, there is enough room in the case for only a very small plug-in card, such as GVP's 286 PC card. Although I did not verify its claim, ICD states that the GVP card works well in the Trifecta 500.

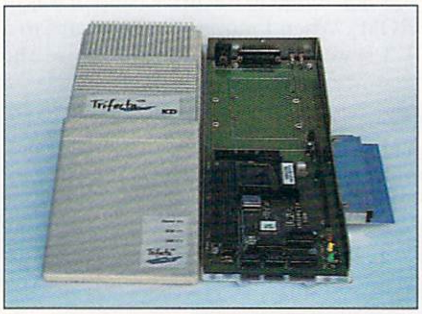
Expanding Plans and Pains

The ICDPrepHD software that comes with the Trifecta allows you to partition and format the drive. The software is very easy to use, and the Auto button performs the whole process automatically for the novice. The software could include a little more control over advanced options, however. For example, when I installed the drive on a 2.0 system, the FastFileSystem was not added to the drive (since it was in ROM). When I moved the hard card to a 1.3 system, it would not recognize the ►

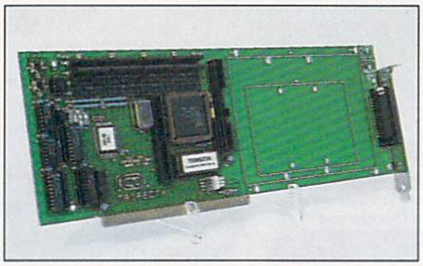
drive, and I found no option (such as "Update Filesystem" on Commodore's HDToolBox) that would let me simply add the file system to the drive.

When I decided to reformat the whole drive on the 1.3 system, I discovered just how difficult it is to use the ICD software on a one-floppy system. Because ICD's disk isn't bootable, you must start from the Workbench. When you run ICD-PrepHD, however, you also need some Workbench files. This means you'll need to make about four disk swaps just to run the program.

I ran through the formatting procedure, and when it was just about done, a requester appeared telling me that it could not find the file "L:FastFileSystem." That was because the last disk I had inserted was the ICD disk, not Workbench. Instead of prompting me to insert the Workbench disk, the formatting program simply quit, and I had to start all over again. This time, I copied all of the files from the ICD disk to the RAM disk and changed its volume label



ICD's Trifecta 500 slips onto the side bus of the Amiga 500.



Trifecta 2000 uses a slot.

to "ICDPrepHD," which avoided all the disk swapping and all of the problems. ICD could easily prevent a lot of user grief by including two bootable disks, one for use with AmigaDOS 1.3 and another for 2.0.

Serves Its Needs

One final quirk surfaced in the process of configuring the IDE drive. According to its technical support, ICD's IDE configuration is not compatible with Commodore's, which means that the controller in the Amiga 4000 won't read the data on a Trifecta IDE drive, and vice versa. This type of interchangeability is taken for granted with Amiga SCSI drives, and can be very convenient when you are upgrading your machine.

In addition to the drive-prep software, ICD includes a memory-test program, a Mount program that adds drives that were disabled at boot time, and a CLI program that allows you to fine-tune drive performance by disabling "Quick" I/O mode or turning off DMA transfers. An included driver allows you to use your hard drive with both the A-Max (ReadySoft) and Emplant (Utilities Unlimited) Macintosh emulators.

Once configured, both the Trifecta hard drives performed well. Although the SCSI drive tested somewhat faster than the IDE (as expected), the speed of each was generally quite good. Using Diskspeed 4.2, the 256K buffer reads reached about 800K with both drives, close to the maximum performance for the drives used. Because the LX version of the Trifecta supports the new SCSI-2 standard, you are likely to see much higher speed figures when using costly high-performance drives.

There are no unexpected memory-configuration problems with the A2000 or A500. I was somewhat surprised to find that the 16-bit memory and drive worked fine in an A4000/030, even though ICD states that the boards are only for use with their intended machines. The Trifecta 2000 did not work, however, in an A3000.

Reading Material

The Trifecta comes with both a hardware and a software manual. The hardware documentation is particularly good, with lots of diagrams and detailed instructions. The software manual is also quite complete, with sections explaining hard-drive terminology and SCSI and IDE concepts. I would like to see an index, however, as well as more in-depth guidance for single-drive Workbench 1.3 users.

The Trifecta provides an extremely useful expansion alternative for Amiga 500 and 2000 owners. The combination of low-cost IDE hard-drive expansion and full memory expansion can help extend the useful life of those classic Amigas. The SCSI-2 adapter option leaves open the possibility of add-ons such as high-performance hard drives, CD-ROM drives, removable-media hard drives, and scanners. Now, aren't all of you"orphaned" Amiga 500 and 2000 owners feeling a little better?

—Sheldon Leemon

Quarterback Tools Deluxe

***New Horizons/Central Coast Software*, $125.**

All Amigas.
Not copy-protected.
1.2/1.3/2.0/3.0 compatible.
Hard-drive installable.
Accelerator compatible.
Minimum system: 512K for floppy disk, 1MB for hard drives, AmigaDOS 1.2 or later.

Ami-Back Tools

***Moonlighter Software Development*, $79.95.**

All Amigas.
Not copy-protected.
1.2/1.3/2.0/3.0 compatible.
Hard-drive installable.
Accelerator compatible.
Minimum system: 512K, AmigaDOS 1.2 or later.

Utility software for floppy and hard-drive maintenance and optimization.

While Amiga users have always had an impressive array of paint, publishing, and animation software at their disposal, disk-utility software offerings for their machines have been few and far between. Dave Haynie's recently overhauled shareware program, DiskSalv, and Central Coast Software's first release of Quarterback Tools were excellent programs, but they offered only limited functionality. Many Amiga owners longed for Amiga versions of such heavyweight contenders as Norton Utilities and PC Tools.

Back-to-Back

Now, Amiga users finally have just cause to celebrate. After years of waiting, two updated Amiga disk-utility products have been released. Thanks to Moonlighter Software Development's Ami-Back Tools (ABT) and Central Coast Software's QuarterBack Tools Deluxe (QBTD), Amiga owners can finally recover deleted files, optimize hard drives, and generally perform a plethora of other disk-maintenance and repair operations.

Installation for both programs is straightforward. QBTD utilizes a handy "drag and drop" method for hard-drive installation, while ABT uses the increasingly popular Commodore-issue installation technique. Both programs are small—ABT requires a meager 350K of hard-drive space, while QBTD occupies 700K. Both offer support for AmigaDOS 2.0/3.0, ARexx, and keyboard equivalents, and neither is copy protected.

The programs are also similar in other respects. Both fully support operations that are *de rigueur* in any disk-utility program: disk analyzation, disk repair, file recovery, file undeletion, and disk optimization. Both perform these operations reasonably well. I tested ABT and QBTD in my A3000 on a variety of disk media—from defective 3.5-inch floppies to a 50MB SCSI hard drive. I erased files and formatted disks, then put both programs to the test on their ability to recover deleted files. Each performed well, in some cases recovering files deleted days before I attempted to recover them.

Seriously defective floppy disks gave both programs some trouble, although I was able to salvage some of the data from the floppies I tested. The disk-optimization feature of both programs worked well, managing to shave a few seconds from the load times and initial hard-drive booting process, as well as noticeably speeding up floppy-disk access.

Quarterback Tools Deluxe

These programs may share disk options, but each has a number of unique strengths and weaknesses. Due to the presence of Quarterback Tools on the Amiga scene for nearly two years before the introduction of Ami-Back, QBTD offers a broader array of program features. In it, the main disk utilities are separate modules of the same QuarterBack Tools program. In addition to these main utilities, a variety of other useful mini applications are included.

A disk duplicator makes multiple disk copies, and you can use the file locator to scan a volume for files or programs that match a certain alphanumeric keyword. A file-encryption program allows you to protect sensitive files and programs from unauthorized use by encoding them with user-definable passwords, and the uniquely named "brain cloud" application prevents anyone from accessing an AmigaDOS floppy disk without the appropriate password.

The venerable System Mover program, first seen in New Horizon's ProWrite word processor years ago, has undergone the software equivalent of a facelift, and is now ideal for moving printer, font, and other files between volumes. For assistance with any of these features, QBTD ships with an excellent 86-page instruction manual, complete with an index, glossary, table of contents, and extensive troubleshooting section.

Ami-Back Tools

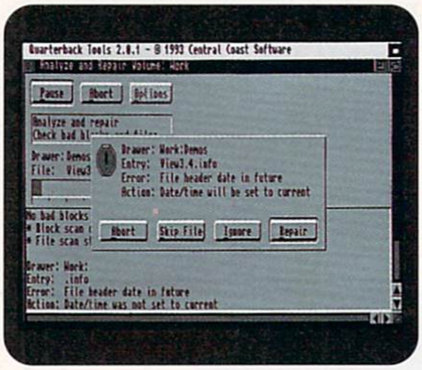
Although it is not as option-laden as QBTD, Ami-Back Tools offers some unique features of its own. Just as in Ami-Back, Moonlighter's back-up program, ABT provides on-line help through the AmigaGuide help system. Move the pointer over a button or requester and then press the Help key for detailed information on the function of that screen element.

ABT's CRC database option can take a snapshot of the current status of files and directories on a hard drive, and can later be used to see if any changes have been recorded in the files—a perfect way to detect the intrusion of a virus onto a hard disk. You can also restrict access to the database option and other ABT programs by way of a two-level password protection system.

For more advanced users, ABT allows a limited amount of rigid-disk block (RDB) management. RDB information can be saved to or loaded from disk. In the case of a hard-drive crash, having a copy of the RDB information from your hard-disk can be a godsend.

Possibly the most impressive feature of ►

ABT is the included Ami-Sched II program. An updated version of the backup-scheduling product bundled with Ami-Back, Ami-Sched II allows a truly amazing level of control over the operation of both Ami-Back and ABT. Using Ami-Sched II, you can automatically have ABT optimize your hard disk at the end of each month, while it goes about the unattended task of automatically backing up your files to a tape drive at 9PM every Friday evening. Teamed with Ami-Back and Ami-Sched, Ami-Back Tools emerges as a solid, cohesive system of disk and file protection.



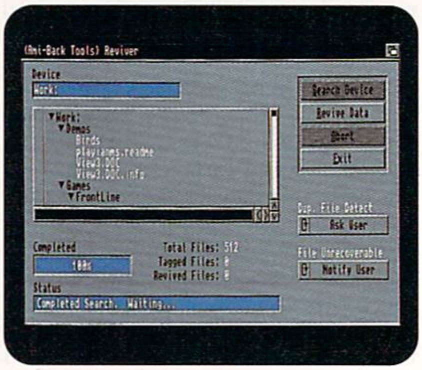
Quarterback Tools never looked better.

TIED SCORE

As mentioned previously, each of these disk utilities has its individual strengths. Surprisingly, though, they both seem to suffer a number of irksome shortcomings. When optimizing drive volumes, the graphical display each program employs is nearly useless. The displays are fine for checking progress, but no help in determining when files are verified, read, or written.

When drive optimization is in progress, it would be most welcome to have a detailed display broken down into discrete, individual units. Furthermore, the manuals included with both programs should supply more detailed information on the structure, organization, and operation of disk drives and their function. There is a risk of losing data every time you use a disk utility; arming you with useful, pertinent information is just as important as recovering deleted files.

Both programs are valuable utilities. QuarterBack Tools Deluxe offers a wider range of features, while Ami-Back Tools nicely complements Ami-Back, combining with it to form a complete disk-utility solution. Pressed to name my favorite of the two, I would give Quarterback Tools Deluxe the nod. A slick interface, extensive reporting capability, and multiple features make it the superior product, but just barely. Both these programs solidly fill the disk-utility gap that once existed in the world of Amiga productivity software.



Ami-Back Tools to the rescue.

—Jeff James ■

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The Game Preserve

By Peter Olafson, AW Games Editor

VR-Slingshot

A
1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable.
No copy-protection.

VIRTUAL REALITY (VR) may well be the future of computer gaming, but to date you would be forgiven for seeing it mainly as the present state of computer-game marketing. Prepare, then, to be pleasantly surprised by **VR-Slingshot** (***Ixion***, $149.95). This high-end Amiga cybersport—a "generalized physical simulation" more than three years in the making—has a distinctive feel that is all its own.

It's not quite *The Lawnmower Man*, but let's just say it rakes the leaves off the front walk and plants some new bulbs in the front window boxes—a solid and convincing first step into desktop VR. There's the sense here of being…well, not entirely in your chair.

Set in a giant cylinder, VR-Slingshot is built around a duel between two triangular orange-red aircraft—one of them piloted by you, the other either by a pal or by the computer. They have guns and engines that leave behind a pixely plume of exhaust and ramming capabilities that can send the other craft sprawling. They launch in opposite directions from a floating blue slab, and the one that expends the least amount of energy at the end of the pre-set time period is the winner. There's no way to die (the game is itself a game), but you can get booted into a helpless spin—tetherball style—by an attentive opponent.

The sense of flight is nothing less than exhilarating. It's almost as if you had wings, or to be less fanciful, as if you were in a hang glider with a jet engine. Forget frame rate, which is an issue for struggling slow programs; VR-Slingshot is so fluid even during modem play that the computer no longer seems to matter. And this is what virtual reality is all about—taking the medium out of the message.



Navigate your aircraft through virtual reality in VR-Slingshot.

At one point, I abandoned the chase and navigated my craft all the way up to the top of the arena, and when I cut back the throttle to glide, the rush of acceleration (taken from the turbocharger on the author's car) gave way to an echoed roar like high-altitude soaring. This was a positively liberating experience; I've never felt so free in a game. It's a sensation helped along by optional stereo-vision 3-D glasses (available from a number of companies such as MegageM), an amplifier, and a pair of headphones (which give you full access to the game's delightful stereo sounds). ►

CRIB NOTES

Indiana Jones and the Fate of Atlantis

We're in for it now. Even the credits for Indiana Jones and the Fate of Atlantis (*LucasArts*) pose a challenge—albeit a very modest one. It will take some clicking around to get the game under way. There's no rush, of course, and you should feel free to amble about, enjoy the descriptions, and not worry about finding any objects at this stage.

If you'd rather do it yourself, just remember that you're looking for a statue. Have Indy look at the "peculiar statue" in the garret (which places him atop the trap door). In the room below, have him try to get the rope at the base of the statue. In the library, have him look at the books on statues. In the room beneath that, have him fiddle with the cat statues. And in the boiler room, simply open all the lockers; it'll always be in the last one. (Hey, this sounds more like a Monkey Island game!)

Back to the office to see Marcus and your visitor, Mr....uh...Smith. You'll quickly sort out that he's a Nazi agent and realize that you'll need to warn your former comrade-in-antiquities, Sophia Hapgood, who's giving a talk on Atlantean culture at a theater in New York. The show's sold out, but there is that side entrance...and a stubborn doorman in your path. What to do? You've doubtless heard about the various pathways through this game; the point at which they split off from one another is still some ways down the road, but the decision you make at the theater will determine what Sophia suggests to you later on. (However, it doesn't commit you in any way.)

You can talk your way past the doorman if you sing Sophia's praises, don't insult him, and don't use too many words he doesn't understand. (The poor fellow loves Sophia, but he's not too bright.) You can shove some crates around to clear a path to the fire escape, or you could just beat him up. However, before you do anything, collect the newspaper from the stand outside. (No, you can't use the phone.)

Back inside, you'll find yourself in the wings, with Sophia in the background going on and on and on about Atlantis, and another stub- ►

A—Wow! Exquisite. A must for your games library.
B—Great fun. Plenty of entertainment value here.
C—Meets expectations. Good, solid, performer.
D—Disappointing. Lots of room for improvement.
F—A real stinker. Don't waste your time.
*** You may encounter some problems under this operating system and/or require a PAL/NTSC adapter.**

Circle 93 on Reader Service card.

VR Slingshot is the work of John Schultz (author of the 3-D shoot 'em-up Space Spuds and co-designer of the interface for Haitex's X-Specs), who first showed VRS at Commodore's 1990 developers' conference in Atlanta under the name Event Horizon. The product wound up at Ixion, Inc.—a Seattle-based hardware and software publisher best known for its work in the medical field (and with no prior game experience)—for whom Schultz was programming a surgical trainer.

He's invested his model with sophisticated math and physics. Sensible real-world physical rules apply to tumbles, collisions, projectiles, and velocity. Naturally, all this is invisible to the gamer—except through the game's natural feel, which is much closer to that of a futuristic sport than an F-15.

And yet, complicated as the engine may be, the game itself is blissfully simple. Aside from the two aircraft—the game cries out for network play—there's just a hangar at the center of the cylinder's floor (which can be flown through), the blue slab above (which generates its own gravitational field, and can be landed on), and a globe at the peak. The heads-up display consists of line drawings showing the craft's trim and horizon and the opponent's location, with registers below for velocity, altitude, and throttle.

There is an external view—useful for getting your bearings when a persistent opponent is on your tail—available by hitting the space bar. But if you have the right joystick, you can run the whole show from there. The alternative is a rather awkward use of joystick for direction and control and mouse for throttle. (You'll also have to use the keyboard before starting

CRIB NOTES

From p. 74.

born Sophia fan preventing you from hitting the stage. Just keep trying to talk to the stagehand, wait through the two ensuing bits of Sophia's talk and when you can squeeze a word in, offer him your newspaper. He'll abandon his post and return only to intercede if you try to get on-stage.

You'll have to find another way, and, as you might guess, it involves the prop of Nur-Ab-Sal and the machine off to the left. This is purely a trial-and-error affair, so I'll cut to the chase: Pull the left and right levers and push the button, and off Nur-Ab-Sal goes, slightly ahead of schedule. Here comes Sophia—hubba-hubba—and she's not too pleased, but you've got her attention.

The sequence in her dressing room is virtually automatic—you can follow any conversational thread you please—and then it's off to Iceland for a visit with Dr. Heimdall on the subject of Plato's Lost Dialogue. He's full of nonsense—for a good laugh, ask him several times about the eel artifact he's trying to free—and there's not really anything to do here (yet!). But if you persevere, he'll drop a couple of names: Sternhart (who is at Tikal in the Yucatan) and Costa (who's in the Azores), which is all you need to hear for those places to turn up on the map.

Well, you know you're not on the "team" path. In Tikal, Sophia won't take even a step into the jungle. And while Indy will, he's desperately afraid of snakes and can't be coaxed anywhere near the major-league snake in the tree beside the chasm. The solution's pretty simple if you were observant on your passage through the bush: There's a jungle rodent in there that would make a tasty morsel for a big snake if he could be persuaded to get close enough to it. Just use your whip to scare the critter into the path entrance at the middle and rear of the jungle area. Watch the wrestling match, then climb the tree. (There's another cute bit when you land.)

This game is full of stubborn people. Sternhart won't let you visit the temple without a quiz, Sophia doesn't have any good ideas, and you can't even steal the trinkets from the concession stand. But didja notice how the parrot piped up when Sternhart asked you for the dialogue's title? Talk to the parrot about "title" (try out the other options for a bit of fun), then try Sternhart again and *voilà*—you're in.

But again, as in Iceland, there doesn't seem to be much to do. One of the spiral designs is of special interest—and seems to be takeable—but it's gummed up with tarnish and you don't have any degummer. Or do you? The only thing of note at the concession stand is a kerosene lamp, and kerosene just might do the trick.

However, you'll have to lose Sternhart, who keeps following you around as though he owns the place. While in the temple, have a chat with Sophia, ask her to keep him busy and hustle out to get the lamp when they start to chat.

The spiral design can be put to use immediately; it's the nose for the elephant sculpture at temple-left. Use it there, then pull it to reveal a hidden Atlantean tomb. Sternhart will then drop his string of superlatives long enough to grab the world stone from the alcove and nip out through a secret door at the rear; nothing you can do about that, but do take a look at the tomb and take the bead of orichalcum you'll find there. You're done here. (Just for fun, try the parrot again on your way out.)

You could move on directly to Costa and the Azores from here, but there's really nothing to be done. The old man wants something in trade for his info on the lost dialogue, and you don't have anything to offer beyond Sophia's necklace (which she won't part with) and the bead (which doesn't interest him).

So head back to Iceland, where you'll discover that Heimdall now does a great imitation of a popsicle, but that the good doctor first managed to de-ice just enough of the eel artifact for you to pop the bead in its mouth. The consequent melting frees the artifact, which you can haul back to the Azores to Costa, from whom you learn that the dialogue has been right under your nose all along—in a collection back at Barnett College. Indeed, it's in one of the same rooms that Indy was bumbling around in as the game opened.

Trouble is, not even LucasArts could tell you which room. In a given game, it could be in any one of three places, and all you can do is go through them until you find it. Before you set out, you may want to collect a few items that will smooth the path: the jar of mayonnaise from the fridge in Indy's office, the rag and lump of coal from the boiler room, and the wad of gum from under the school desk in the library.

While you're in the library, climb the rope to the storeroom, use the mayonnaise on the totem pole so you can move it easily and pull it twice to bring it under the hole in the ceiling. This lets you back up into the attic, where the game began. Don't waste time with the trunk, which can't be opened. But the urn beside the trapdoor is another matter. Get the ashes it contains, and you'll find they conceal a dusty key.

Climb back down into the storage room, where there's not much to do—the rope stays—but grab the arrowhead off the shelf at the rear (it's brown) and use your influence on the big crate at the left. Seems there's a dusty chest behind it, and you just happen to have a dusty key.

If the dialogue isn't in there, descend to the library and use the rag on the arrowhead. This creates a makeshift screwdriver—and a less-likely device I've rarely seen—which you can use to remove the five screws that hold shut the back of the bookcase you so unceremoniously tipped over.

There's also another, somewhat less torturous, way to check out the bookcase. Head for the boiler room, and use the gum on the coal chute for traction. This route puts you in the cellar room with the cat figurines. (Curious that there's no other way to get there, eh?) Throw the coal at the book visible just above the hole in the ceiling.

And if that doesn't work—well, there's only one more spot to look. Check out the cat figurines; take the wax one back to the boiler room and put it in the furnace to melt. (This'll sound dumb, but first open the furnace door, which looks as though it's open when it's closed.)

Once you find the document, meet up with Sophia in your office and save your game before you make any big decisions. We've reached the point at which the game's three paths separate, and you may later want to go back and replay the game from another route.

Next time: On to Algeria.

To locate vendors of the games reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 90.

play to type out macros for the in-game comments to be sent to your opponent and the function keys to send them.)

The VRS I saw was at a beta stage, with play still being tweaked and additional touches contemplated. Nevertheless, my only criticism of consequence is that the product as planned cuts a rather narrow swath, without additional arenas, aircraft, or entangling Imagine objects.

These additions (along with support for head-mounted VR displays) may well be addressed in future releases—an editor is a good bet if VRS does well—and in the mean time their absence does give the game a happy, uncluttered purity. Schultz wisely has not layered it with features—he's focused on making the environment feel persuasive—and the basic fun always shines through the veil of the interface.

The biggest stumbling block will probably be at the user's end: All of this good stuff does not come cheap, either in price or equipment. VR-Slingshot, which may be available by the time you read this, will list for $149.95 in large part due to the required adapter box that handles the jacks for the necessary analog joystick and optional 3-D glasses—and your outlay may come closer to $200 when you throw in a couple of extras.

On the specs end, it requires at least a 68020 processor and 2MB of RAM (of which slightly over 1MB is used), with an '030 or '040 recommended for the game's performance ceiling of 30 frames per second. And while you can play against four levels of computer opponent, you'll almost certainly want a modem—at least 2400 baud, and ideally 9600 baud or a null-modem cable. An IBM-compatible analog joystick, much prized among flight-sim enthusiasts, is likewise needed—and so much the better if you have one that includes a throttle control (like the CH Products Flightstick), as this can be enabled with an optional cable available from Ixion. This expense may limit play to a knot of hard-core gamers, but great software can lead gamers to improve their hardware—look at Wing Commander on the IBM—and VR is something that everyone should have the opportunity to experience.

WALKER

B — 1.3 ✓ 2.0 ✓ 3.0 ✓
Not hard-drive installable.
No copy-protection.

HERE'S A WHOLE new way to kill Lemmings: Have a great stomping metal monster machine-gun shoot 'em to death. That's essentially your task in **Walker** (***Psygnosis***, $59.95)—a potent shoot 'em-up from DMA Design in which a sprite from the impossible game that helped get the developers started takes on the little guys from the impossible game that made them famous.

Lemmings? Not exactly. More like Lemming-*sized* soldiers running into position ahead of you and behind you, parachuting from zeppelins, rappelling down ropes from the top of the screen, or mounted in the ruins above. They sit behind artillery pieces, drive tanks and trucks, pilot Messerschmitts, and do not like you one damn bit.

See, you're piloting the author of all this chaos: a Walker AG-9—essentially a more substantial version of the two-legged Imperial Walkers from *The Empire Strikes Back.* (You may recall a variation of it from one of the sprites in DMA's Blood Money in 1989.)

This sort of wholesale carnage it bears has a definite joyful tone; indeed, this seems to be the whole point here. The Walker's twin carbines cut up enemy infantry (and even its little horses) into red splishiness like miniature tomatoes, ignite incandescent explosions in vehicles, and tear up the earth where they miss. It rolls its head very effectively through about 140



You'll destroy miniature soldiers in Walker.

degrees—vertically and horizontally—with a kind of malevolent, big-cat smoothness, and it comes on like a regular T-Rex. My only regret is that you can't use this baby MechWarrior to trample the enemy.

There's not all that much to keep track of, either, which leaves you free to focus on that one last cannon or the digitized tips and orders crackling from your radio. There's a heat gauge, which rises during prolonged fire, and a shield gauge, which drops as the Walker takes punishment. (One especially nice feature is the lock-on, which means that you don't have to maintain your aim when firing; great for shooting down speedy aircraft.)

This deconstruction of the Lemmings ethic is executed with DMA's usual flair for miniatures—though it seems a bit like setting up plastic soldiers only to knock them down. However, it's quite different from the usual shoot 'em-up fare, and a few things may throw you off. Yes, Walker scrolls sideways, but only from set-piece battle to set-piece battle, rather than a continuous flow. The right-to-left movement takes a little getting used to (the convention in side-scrolling arcade games is left-to-right) as are the dual controls (mouse for aiming and firing, keyboard or joystick for movement). These things do help keep the game fresh, though, as do the game's four war zones—and after a while Walker could use a bit of freshness. Come the third session, I began to find it sort of monotonous—in essence, it's just a sophisticated shooting gallery—and I wondered if the ability to move laterally or some new weapons might have given playability a boost.

It's also a very long load, especially on a single-drive system, which would have made this a particularly good choice for hard-disk installation. But while Walker comes on three AmigaDOS disks and so can readily be copied to hard disk, I couldn't find a way to run it from there. (Evidently the loader is in a boot-block.) One would think that, after the HD-installable Lemmings II, Psygnosis would have learned its lesson.

A nice game, and an unconventional one, but it could have been better.

REALMS OF ARKANIA

A- — 1.3 ✓ 2.0 ✓ 3.0 ✓
Hard-drive installable.
Copy-protection.

I HARDLY KNOW where to start. There's an enormous amount to like about **Realms of Arkania: Blade of Destiny** (***Sir-Tech***, $59.95), not the least of which is its enormousness. ►

This eight-disk German import, based on the pencil-and-paper game Das Schwarze Auge, may well be the largest Amiga role-player ever conceived. (Wait till you see the game map.) Size itself shouldn't be much of a surprise in an RPG—they're all monsters at heart, right?—but this world has been done up with such high-spirited thoroughness that it hangs about your shoulders like a friendly, hairy forearm. ROA doesn't just have size; it has a certain weight.

It starts out in very traditional fashion. You're managing the affairs of a six-member party (pre-made or do-it-yourself) searching for an orc-cleaving sword on a great continent at the brink of war. The party starts off in the bustling port city of Thorwal with ordinary equipment and appetites, and they prosper while doing brave deeds in dark places. The 3-D graphics are very nice, and the larger-than-usual window gives them greater-than-usual presence. Screen layout is a lot like Might & Magic III (portraits below, icons at the upper right), and movement is the old square-by-square shuffle.

For a game of this type, Realms of Arkania is just amazingly interactive. RPGs too often treat as a privilege the ability to



You'll need to mind your Ps & Qs in Realms of Arkania.

just talk to someone who responds in more than grunts. (The Ultima series is a notable exception.) Here, at most every turn, handy-dandy green menu boxes are tossed up offering options to select things to say and places to go. There's not an empty house in town, and not a mouth that isn't flapping.

I would need most of this column to mention everything that delighted me in this Realm: the ability to haggle with shopkeepers when buying and selling; the graphic shop and character inventories (the latter borrowed from Dungeon Master and Eye of the Beholder); the signposts on the roads and schedule of ships passing through Thorwal; the "novice" mode, which saves you the bother of fiddling with stats and skills; the way two beers is more than enough for certain members of your party (the druid's always the party-pooper); the dense, interwoven knots and environment and character; and one of the most informative and purely enjoyable manuals to grace a European-made game. (It's the work of Sir-Tech's Brenda Garno.)

For a change, this game encourages a certain amount of circumspection. People live here; if they're not home, you can break in (à la Keef the Thief) and risk arrest. If they're home, they'll boot you right out, so mind your manners.

ROA certainly does. It automaps and installs on hard disk (at 9MB it better), and the intro's separate and discrete from

the game proper. It even multitasks; in fact, it's chewing up around 1.2MB in the background as I type this. At its best, playing Realms of Arkania is a process of continual discovery. I've booted the game at least dozen times now, and I've always come away grinning at some nice touch I hadn't noticed before. I had worried a bit before release that ROA's Nordic bent might not thrive on foreign shores, but that proved needless because only the character names are a giveaway.

This is not to say it's without a few weaknesses. A bit more variety in the graphics would have been welcome. There's a good deal of combat—forgivable in this case, since ROA is basically cast as a war game—which takes place from an angled-down perspective on its own screen. The animations here are well-done compared to, say, the two-frame ones used in SSI's "gold box" line, but overall it's a rather slow and formulaic affair.

The 1MB barrier that has held since the late '80s is beginning to erode; you can play ROA with 1MB, but only by disabling the music or with degraded graphics in the city scenes. I recommend at least 1.5MB and a hard disk.

SHORT TAKES

Morph

A — 1.3 ✓ 2.0 ✓ 3.0 –
Not hard-drive installable.
No copy-protection.

Morph is easily my favorite game in this month's bunch. This *Millennium* release (about $35) is an arcade puzzler that is every bit as creative as Putty or Sleepwalker: bright, bold, and intelligent. You try to steer a changeable elemental blob—at any given time either solid, rubbery, watery, or gaseous—through a homey environment to an exit. The gimmick: It's permitted a limited number of metamorphoses (hence the title) between states, and the environment is laden with mechanisms that will change him over whether you want it to or not. The puzzles are just tough-minded enough to keep dragging you back without putting you off. The central character is charming (a set of silly eyes is perched on each blob), and the whole thing's infected with a solid sense of fun.

The bad news is that it doesn't run on the A1200—an AGA version's in the works—and it requires a multisync monitor (like CBM's 1960) to get the full display. Morph is available only in a PAL version, and even with the screen jiggered up an inch on the 1084S via the necessary PALboot program, the number of times you can switch into each elemental state remains out of sight below screen-bottom. For me, that wasn't a problem so much as an additional challenge... and I have to say I enjoyed it all mightily.

Worlds of Legend: Son of the Empire

B– — 1.3 ✓ 2.0 ✓ 3.0 ✓
Not hard-drive installable.
No copy-protection.

This import from *Mindscape International* (about $40) is a very nice RPG. Trouble is, Worlds of Legend was also a very nice RPG around the same time last year when it was called just Legend (The Four Crystals of Trazere in the US). Mindscape has given the game an Asian cast and a new story, but with pretty much the same graphics, music, and game system (you're still looking for four pieces of something) without any notable improvements (it still doesn't go on hard disk). It's a dandy game system—with auto-mapping and that creative spell-builder—but we've seen it before. I'd be more forgiving if this were simply a data disk.

SimLife

B– — 1.3 ✓ 2.0 ✓ 3.0 ✓
Hard-drive installable.
No copy-protection.

When SimLife, cousin to SimEarth (*Mindscape International*, about $70) was released in early July, it became the first Amiga game to be originally released in (rather than simply upgraded to) an AGA version.

And, to be sure, the windows and gadget control panels look very hot—especially in hi-res mode—but nice pictures are secondary to mechanism here. This "software toy" plucked from the Maxis stable is an electronic petri dish that enables you to (among other things) practice recombinant genetics without a license—whipping up weird new critters and placing them to die, thrive, or fertilize and then twisting the environment to see what havoc you can wreak on them.

My head liked it a lot but my heart found it wanting. Maxis's sims have gotten steadily more ambitious and cerebral since SimCity...and less fun. SimLife, which could easily have been made more fun, does nothing to change that. Pray for SimFarm. (Note: A "standard" version of SimLife for older Amiga models is planned.)

The 17-Bit Collection

B+ — 1.3 ✓ 2.0 ✓ 3.0 Not yet tested.
CD only.

The 17-Bit Collection (*Almathera Systems Ltd.*, about $80) consists of 2301 Amiga disks compressed onto two CDs from one of the biggest and best English public-domain software houses. This massive collection includes a huge number of demos, music files, utilities, and general fun stuff, as well as an enormous number of games. Among the many finds: a non-interactive demo for Ocean's never-to-be-released Billy the Kid, another demo for the early Delphine game Castle Warrior (which is interesting, but bears no resemblance to that label's more recent stuff), and the Pugs in Space animation (the basis for Psygnosis's forthcoming Pugsey).

Unfortunately, this is a case of terrific substance and lazy presentation. The Collection de-archives the disks just fine—they can't be run directly from CD; CDTV owners must have a floppy drive to use them—but it lacks even the most rudimentary sort-and-search program in the fashion of the Fish CD. Hence, finding what you're looking for is pretty much a matter of trolling through 2301 descriptions (which are none too complete) until you stumble over it.

AV-8B Harrier Assault

B — 1.3 ✓ 2.0 ✓ 3.0 ✓
Hard-drive installable.
No copy-protection.

The IBM world is suddenly laden with games that incorporate strategy- and war-game elements within traditional flight sims. Harrier Assault (*Domark*, $59.95) is the first to reach the Amiga, and it's not as awful as you may have been led to believe by the UK press.

You don't just fly missions in this celebrated vertical-takeoff-and-landing aircraft, but use it as a key tool in the land war you're also directing on the island of East Timor. (East Timor?) It lends the game great moment when a mission really means something for success in the overall game—rather than some artificial result or simply your survival or non-survival—and Harrier Assault can get quite involving both in the pilot's seat and at the strategic map from which orders are dispatched.

Alas, the plane's profile isn't sharp on this lo-res display—it looks like a flying fuzzy puppy—and I've seen better explosions on C-64s. It walks, ►

MORE SHORT TAKES

rather than runs, on a vanilla A500 (an accelerator or fast machine is a must), and I found it infuriatingly difficult in the campaign planner to make the map display do what I wanted. Still, this flies. It's just a bit wobbly.

WAR IN THE GULF

C+ | 1.3 ✓ | 2.0 ✓ | 3.0 ✓ | Hard-drive installable. | Copy-protection.

War in the Gulf is another data disk dressed up as a full game. This third in a series of modern-era tank games from Empire ($49.95, distributed by *ReadySoft*)—based on a 1995 scenario in which Iraq pokes its nose back into northern Kuwait—is more or less Team Yankee III. Or, more to the point, Pacific Islands II, as it preserves PI's budgetary elements. (If you need persuading, just look at the filenames.)

I liked the two earlier games a good deal for the four-way split screen views, the easy-going mouse controls, and the slick graphics. (The explosions were pretty slick, too.) That's all here, with new missions in a new desert setting, but without any striking new features, and with an intro that appears to have been partly nicked from Campaign. This game engine has been recycled one too many times, and seems to have run out of gas. Tanks, Empire, but no tanks.

CAMPAIGN SCENARIO DISK

A– | 1.3 ✓ | 2.0 ✓ | 3.0 – | Hard-drive installable. | Copy-protection.

Here's a data disk that gives that whole mission-disk genre a good name: 25 new battles from the hand of *Campaign* ($29.95) author Jonathan Griffiths for Empire's just-slightly-overcomplicated World War II-era tank game. I hadn't picked up the parent game in months, and right now I can't imagine putting it down. North Africa, Italy, Normandy, Stalingrad, Leningrad, the Ukraine, and those last desperate battles outside Berlin—they're all here, and they're a tough lot as well.

Shame they didn't take this opportunity to make Campaign run under 3.0, however. And the manual's disappointingly brief beside the little encyclopedia that accompanied the original game—not least for its references to "Rommel's North American Campaign." (Now, that I'd like to see.) Fire the proofreader, and bring on Campaign II.

DREADNOUGHTS

B+ | 1.3 ✓ | 2.0 ✓ | 3.0 ✓ | Hard-drive installable. | No copy-protection.

Ever wondered what became of those polygon-based, hilltop-point-of-view war games (Waterloo, Austerlitz, Borodino) that were all the rage a few years back? Well, Dr. Peter Turcan's still turning them out—Gettysburg will be his next—and while they've gotten more sophisticated, they haven't lost anything in the way of playability.

Dreadnoughts (*Turcan Research Systems*, about $45) isn't Turcan's first sea-based game—that was Armada—but it is his most expansive, with seven scenarios. It focuses on the surface-fleet exchanges in the first three years of World War I—including the colossal slugfest that was Jutland, with 250 ships-of-the-line in action. (Not an undertaking for the impatient.) That's a bold move in itself, and for the most part it works.

Dreadnoughts may not be the jazziest-looking game around—the system uses modest polygon-ish drawings and updates position in cycles rather than animating the ships—but it is very realistic and, with a little research in the excellent docs, easy to control with the mouse and keyboard. In this battle, Turcan has scored a definite hit. (Data disks—Ironclads, dealing with the Sino- and Russo- Japanese wars, and Bismarck, dealing with WWII—are also available.)

VIRTUAL REALITY STUDIO 2.0

B+ | 1.2/1.3 ✓ | 2.0 ✓ | 3.0 ✓ | Hard-drive installable. | No copy-protection.

These folks evidently pay attention to reviews, and a good thing, too. VRS 2.0 (*Domark*, $99.95)—the newest version of Incentive Software's 3-D game-maker—repairs virtually all of the major shortcomings in the original filled-polygon adventure construction set. It offers new shapes that don't involve straight lines (a sphere, for instance) and transparencies, a second disk full of delightful and well-drawn clip art, a slew of new commands and screen borders (and the ability to make animated ones), a useful manual, and a sound-sample editor. It is generally sharper-looking and somewhat easier to use than its predecessor.

The problem is, with all these features laid on, VRS 2.0 is that much slower, even on an A3000/25. (I didn't get really good performance out of it until I put it on a 40MHz A1200.) And where's the sample game?

Nevertheless, this has me hungry for the next follow-up: Superscape.

ARABIAN NIGHTS

A– | 1.2/1.3 ✓ | 2.0 – | 3.0 – | Not hard-drive installable. | No copy-protection.

For some reason, I had a torrent of war games this month. I was especially happy when this one from England's *Krisalis* (about $30) moseyed in. On one hand, there's no shortage of this sort of game—and the label's forthcoming Soccer Kid appears to be in much the same vein. But there's always room for a spirited and creative romp. Also, even the most ordinary Amiga handles this type of game brilliantly: bold-colored scenes, increasingly clever puzzles, and breakaway pace.

Arabian Nights combines elements of classic "cute" console games (jewel and key collecting, hacking into hidden areas) with a good deal of variety: our hero in the drink, on a flying carpet, and in a mine car. You'd think a kid with a head this big would have trouble moving this fast. AN also rewards extra memory and a fast processor—unusual for this sort of game. Alas, I couldn't trick it into working under 2.0 or 3.0.

PREY: AN ALIEN ENCOUNTER

B– | 1.2/1.3 ✓ | 2.0 ✓ | 3.0 Not yet tested. | CD only.

Prey (*KirkMoreno Multimedia*) is a bug hunt à la Alien II: Mining asteroid KG-42 is infested with aliens, and you're the cure. Trouble is, you don't have a weapon...and you barely have enough oxygen to make it to the next section of the base.

For the CDTV or an A570-equipped Amiga 500, this Danish game really isn't too bad. It's enjoyable to have the story unfold via panicky radio transmissions as you trundle through this silent, half-lit maze (the screen scrolls in 3D between squares) in search of equipment, crew, and the aliens themselves. And even the typically slow, miserable CD access speed can't interfere with the tension.

However, the rectangular maze isn't all that big (though it'll seem unconquerable until you have it mapped out). Prey's got this thing for abstractly handling elements that should have been rendered in greater detail; there are glowing prone silhouettes when you find the crew and a bizarre light show for fighting the aliens. What's CD for if not to go over the top? ■

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HELP KEY

This month it's all in the (Trump)cards. What do they say for AGA-games? AW's *resident sleuth unearths the dirt.*

By Tim Walsh

TRUMPCARD TEASER

Q. *Recently, a friend gave me a Trumpcard 500 hard drive (Interactive Video Systems) for my Amiga 500. No documentation was included with the drive; however, there was a Trumpcard disk. Trying to boot with the disk results in a message that reads: "DEVS:IVS_SCSI.device Not Found." Is there any way to get the A500 to recognize the Trumpcard?*

Steven P. Scharff
Henderson, Nevada

A. Hopefully, a replacement boot disk will cure the ills. After several discussions with IVS (14804 Beach Blvd., LaMarada, CA 90638; 714/228-2040) staff, they assured me that IVS plans to continue supporting all of its hard-drive controllers, including older models, well into the foreseeable future.

HARD-DRIVE DOWNER

Q. *I have not been able to get AmigaDOS 2.1's standby hard-drive back-up program, HDBackup, to work with both my Amiga 2000's internal drives. It will recognize only df0:. The computer is equipped with a 2.04 Kickstart ROM, a SupraTurbo 28 accelerator, a Trumpcard Pro SCSI hard-drive controller, and a Quantum 105MB hard-drive.*

Michael Bellino
Petaluma, California

A. My past experiences indicate that the Trumpcard SCSI controller is suspect. Even if the hard drive was configured with its supplied software, that's no guarantee that HDBackup fully supports the controller/drive combination. For a quick test, select the Devices option within the program. Activate both df0: and df1:, leaving all the other default settings unchanged. Next, select the Backup option from the Project menu and make certain to select the desired partition on the Quantum to back up. If the program still fails to recognize both df0: and df1: as destination drives, then controller incompatibility might be the problem.

Alternative programs to consider are the freeware offering by Denis Gounelle, ABackup, or the equally popular shareware program BackUP V3.77, by Felix R. Jeske ($15). Commercial hard drive back-up utilities to consider include Moonlighter Software's Ami-Back and New Horizons' Quarterback. Among all of these programs, you should find one that works well with the Trumpcard SCSI controller.

PARADISE LOST

Q. *Since replacing my dying A1000 with an A4000/040, I've suffered headaches. Did I overlook something in the manuals, or am I left holding a big collection of impractical software? For instance, virtually all of my older Psygnosis games seem to be incompatible with the A4000. As impressed as I am with the A4000, some downward compatibility is in order.*

Dave Nave
Atlanta, Georgia

A. No, you didn't overlook any instructions in the manual's fine print. Rather, the same 68040 speed and AGA graphics capabilities that make the A4000 outshine its predecessors make the machine inhospitable to games. With an increasing audience of A1200 owners, game companies are in the process of making AGA-compatible games. Give them time and you'll see games that offer vastly improved graphics over earlier versions.

While you're waiting, the first step in getting a game to work is to power up your A4000 while holding down both mouse buttons and booting games from Workbench-equipped floppies. The second step is to use the freely distributable Degrader program by Chris Hames, now upgraded to version 1.30 (see March '93, p. 110). Finally, get a copy of KillAGA V2.0 by Jolyon Ralph of Almathera Systems Ltd. This program has unique functions that disable AA (AGA) chip-set registers, force sprites to standard ECS resolutions, and disable processor caches. Serious gamers well-stocked with their long-time entertainment favorites might be happiest with an older Amiga as their game machine.

ACTIVATING RAM

Q. *My son, Robert, has an Amiga 500 equipped with a Blizzard board, 7MB of RAM, a 2.04 Kickstart ROM, and a 1MB "fatter" Agnus. In spite of all this upgrading, the computer's Revision 3 motherboard shows only 512K of available chip RAM. Is there a software fix we can implement to get the A500 to recognize the 1MB of RAM?*

Also, in the September '92 Help Key (p. 86), mention is made of adding IFF images to the Workbench via the NickPrefs by Nicola Salmoria. I'd like to know the price and where I can purchase this program.

Sandra French
Spring, Texas

A. I haven't seen a software patch that claims to activate the additional RAM afforded by the Super Agnus. The process requires the skill of trained computer repair persons and involves some fine cutting, bending, soldering, and reassembling. Don't worry—virtually any authorized service center can perform this in a few minutes on either an A500 or A2000.

The freeware NickPrefs is found on all the nets and in PD disk collections. However, programs that display IFF images on the Workbench are not practical on any machine with less than 2MB of chip RAM and a processor slower than a 68030, or for that matter a 68040. Avoid these programs whenever possible, since they drain your system's chip RAM. ■

Write to Help Key, c/o AmigaWorld, *80 Elm St., Peterborough, NH 03458.*

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TrueBASIC programs are portable to DOS, Macintosh and most UNIX workstations. Now you can use the same program code across all platforms for the powerful portability that every programmer dreams about!

Get special pricing on these other TrueBASIC math programs!

Algebra I - Now Only!	T1074	$14.95
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Calculus - Now Only!	T1082	$14.95
Pre-Calculus - Now Only!	T2035	$14.95
Trigonometry - Now Only!	T1093	$14.95
Discrete Mathematics	T2064	$14.95
Probability Theory - Now Only!	T2060	$14.95
TrueSTAT - Now Only!	T2061	$14.95
Get any 2 math programs	T2036	$26.95
Get all 8 math programs	T2062	$94.95
Get all 8 *Plus* TrueBASIC 2.0	T2063	$109.95

The Music Corner

OctaMED Professional, Version 5 $69.95! New!

Over 100,000 copies sold worldwide! **Available in the U. S. for the first time - *exclusively* from DevWare!** OctaMED Pro is *the* premier sequencing package. Version 5 has been *completely* rewritten for Kickstart 2+ (Workbench 2+ is required) and features standard windows and pull-down menus for easy, familiar operation. Discover what thousands of Europeans already know, love and depend on. Compose professional music at a fraction of the price of its higher-priced competitors. CU Amiga Magazine says of **OctaMED Pro 5** "*OctaMED was already* ***by far the best*** *MIDI and sample sequencer about-now it's even better.*" Product code: T5051

An amazingly powerful program at an unbeatable price, ***OctaMED Pro 5*** *features:*

- 8 channels of audio using the Amiga's own built-in audio hardware
- Handles ~~16~~ **64** MIDI channels for even larger orchestration!
- Includes it's own powerful sampling software to create your own instruments!
- ***Has standard music notation display mode!*** Compose & editing using tracker or stave formats
- **Online Help** - just tap the [HELP] key, and up pops a *complete* on-line hypertext manual with full cross-referencing and indexing!! Nothing short of a revolution in software documentation!
- Improved control over sampler and sample editor effects: The pitch changer has optional anti-aliasing, the volume boost has an option 100 per cent limiter to avoid distortion, the filter has a further adjustable paramater, and the mix function allows for alteration of the relative volumes of the two sounds, unused space can be removed from the start or end of a sample, and looping controls are easier to use then ever.
- Redefinable keys and mouse buttons!
- Generic Slide function
- **AutoSave** keeps your current project safe--even if you forget to save, or the power goes out.
- Ability to name blocks in the playlist, or attach strings of text, so that users can know what is happening in each block.
- **Printing:** Print out all blocks of a song, with play list, instrument names and tempo information!

Blues Tutor (T4100) *$29.95*

New Release by DevWare - You will acquire an amazingly rapid mastery of the blues form!

Blues Tutor is a structured, rhythmic system of learning how to play true blues keyboard, utilizing left-hand bass patterns with varied chordal progressions. it is MIDI-based and utilizes your own sequencer (must read standard MIDI files), providing a familiar interface and also a ready means for recording progress. This program makes each step of the process simple - so you can quickly absorb the information and play actual pieces. Instead of bogging down in the boredom of lengthy practice sessions, you will be constantly rewarded with the success of producing real music. When you complete the Blues Tutor course, you will have a real grasp of basic piano theory and blues harmony. This is the first and foundation disk in a series. Future disks will have more advanced playing and genres of music. Compatible with all current Amigas and versions of AmigaDOS.

Mozart's Music Master $29.95

Makes music reading and learning theory easy! Mozart's Music Master has scored rave reviews from music major graduate students. With this new program you can: • Learn music note reading (note recognition) in four clefs (Treble, Alto, Tenor and Bass). A timer with three settings can be used to limit time for note identification. Right and wrong answers can be tallied and displayed. • Learn interval shape recognition. This also can be timed and scored activity. • Learn interval ear training. • Learn to identify scales using a graphic representation. • *Includes bonus feature!* **Music Tutor** allows you to access music terms and identify symbols using its music terms database. Add your own terms to the data base with built-in text processor.

Mozart's Music Master with Music Tutor is easy to use and works with all current Amigas and versions of AmigaDOS. Product code: T4006

The DevWare ToolChest, a quality line of low-cost software, presents powertools for your Amiga. By purchasing this software you receive unmatched versatility, usability, and best of all, you support the independent Amiga developer. The "RK" anthology are registered, fully-functional versions of the cream of the crop in shareware titles. Amiga musicians will want to check out our brand-new AM/FM series...they're packed with fantastic utilities! **Now, many of our programs have reduced packaging to lower the cost and pass the savings on to you, your wallet *and* our environment.**

100% Satisfaction Guaranteed

Designing Minds Educational Software

World Tour Series -- Take a trip this summer and explore the world--right from your home. Complete tutorials provide information on capitols, currency, government, languages, religions, flags, and much more. For ages 9 to adult.

World Tour USA	T4008	**$16.95**
World Tour Canada	T4009	**$16.95**
World Tour Central America	T4010	**$16.95**
World Tour South America	T4011	**$16.95**
World Tour Australia	T4012	**$16.95**
World Tour Africa	T4013	**$16.95**
World Tour Europe	T4014	**$16.95**
World Tour Middle East	T4015	**$16.95**
World Tour India	T4016	**$16.95**
World Tour Russia/West. Asia *New!*	T4017	**$16.95**
Get any 3 World Tours	T4018	**$44.95**
Get any 5 World Tours	T4019	**$69.95**
Get all 10 World Tours	T4020	**$129.95**
Spell-a-Fari	T4021	**$14.95**

A new adventure in Spelling! Friendly animal teachers, Mike the Monkey, Elly the Elephant, Polly the Parrot will help your child become an expert spelling "bee."

Math Doctor	T4022	**$14.95**

Teaches a new way of learning the "old mathematics" with positive reinforcement, speech, colorful graphics and interactive help.

The Talking Storybook Series

The Red Hen	T4023	**$14.95**

Children learn the value of friendship and teamwork.

Nursery Rhymes	T4024	**$14.95**

All the favorite rhymes you grew up with, but digital!

The Three Bears	T4025	**$14.95**

You'll be suprised at what she finds in the cottage.

All About Whales	T4101	**$14.95**

Marvelous facts, pictures & explanations will lead children thru the amazing world of whales.

ABC's	T404	**$14.95**

Snappy rhymes, dancing graphics & witty speech teach the ABC's.

Solar System	T4027	**$14.95**

Hundreds of questions are answered in this Storybook as children take a fascinating tour of the Solar System.

Get any 3 Storybooks	T4028	**$39.95**
Get All 6 Storybooks	T4029	**$74.95**
Crossword Construction Set	T4030	**$16.95**

Create your own! Many great features including selectable background music and IFF pictures.

Poco Man	T4031	**$14.95**

Extremely challenging strategy/logic game. Over 50 levels of thought-provoking fun.

MegaTest $29.95

Attention Parents! Teachers!

Available exclusively from DevWare

This hypertext-like **TEST** and **TUTORIAL AUTHORING PROGRAM** is extremely versatile and can create test designs that integrate sounds, pictures and text into any question. Multiple choice tests can be quickly created with up to five possible answers.

FEATURES Picture, IFF sound and a separate text file can be keyed to any question. When picture or sound is keyed to a question, appropriate button lights up alerting user. Test Mode and Tutorial Mode. Score: number of questions missed and correct is tallied and displayed on the screen each time a question is answered. Will give customized sound feedback indicating a correct or wrong choice. Easy-to-use test maker is a separate program from the testing software. Several sample tests included. Easy-to-use mouse interface. Supports all current AmigaDOS versions. T4004

GoldenIMAGE HardWare

External 3.5" Floppy Drive		
The *only* 3.5" drive compatible with all Amigas!!		
Master 3A-1N, 880K w/disable switch	T3014	$75
Hand Scanner	T3016	$129
JS-105-1MP With Migraph TouchUp and DeluxePaint III from EA. Up to 400dpi, 105mm scan width, 64 halftones		
Hand Scanner	T3017	$191
JS-105-1MP+ Best value! Newest version of Migraph "Touch Up" V3.07, Migraph OCR and DPaint III.		
Upgrade Mouse	T3010	$29
GI-600N The Amiga market's best selling mouse		
Optical Mouse	T3011	$44
Mouse Pen	T3018	$45
A500 Ram Card	T3012	$35
A600 RAM Card	T3013	$74

DevWare

$3.45* ea. 30+ Disks

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****SPECIAL****
Order 15 disks and receive a complimentary copy of Anti-Virus (a $20 value) ***AND*** pick any 3 disks of your choice!

SERVING THE AMIGA COMMUNITY SINCE 1985

Public Domain Library

We have been the official Public Domain Library of all the best Amiga magazines. Find out why these magazines choose us! The first two letters on each disk indicate the orientation of the disk; WB# general interest - most programs can be run from the workbench, FD# games and entertainment, VO# are video related programs/utilities and DD# advanced--requires thorough knowledge of AmigaDOS/CLI. *Thanks to our extensive arsenal of anti-virus software, ALL of our software is guaranteed virus free!*

GUARANTEE - We believe so strongly in our product that we offer a full *lifetime*, complete satisfaction guarantee. No questions asked.

BEST SELLER!

DD79abcd: Amiga "C" Tutorial - This is the most comprehensive C language--*Amiga oriented*--set of tutorials available. Includes full working examples, source code and an incredible set of lessons. Included are full discussions and examples for Amiga programming. 4 disk set, counts as 3.

NEW DISKS

FD90: Conquest & Dominion - Conquer the known world and maintain dominion over it--a microcosm of economic survival.
FD89: Kastle Kumquat - A thoroughly entertaining and challenging maze/adventure game. Great soundtrack and graphics. Req's 1MB Chip RAM (for PAL mode).
FD88: AmyBoulderdash - a clone of the original classic.. extremely well done complete with level editor, 2 complete sets of levels and a level editor. Requires Workbench 2+.
FD87: OXYD- A commercial quality game--similar to Marble Madness in nany ways, but allows two computers to link & play together...see how many of the 200 landscapes you can complete without having to get the hint book!
FD86: UChess: The strongest playing Chess program available for the Amiga period. Req. 68030+, Workbench2+, 4MB RAM or more. Supports AGA (req. 8MB!)
WB133: Panasonic Studio - Special printer Preferences editor and driver system for all Panasonic 9 & 24-pin printers.
WB132: Canon Studio - Special printer Preferences editor and drivers for BJC 800 & 880, LBP, A1, A2, BJC 800, BJ 5, 10, 20, 200, 230, 300, 130.
WB131: Magic Workbench - **Make your 2.04+ Workbench sizzle with style with these 8-color dithered icons. Easy auto-installs in minutes. Req.'s WB2.04+ and hard drive.**
WB130: ToolManger 2 - The ultimate tool manager for your Workbench. Add animated icons, sound effects and 'docks' of programs to your WB..very useful! Req. 2.0+ and hard drive.
WB129: Super Virus Killer - From Safe Hex Int'l, who catalogs and kills Amiga Viruses *worldwide*--a complete virus system that knows all Amiga viruses...updated often. Req. WB 2+
WB128: ColorFonts - contains 12 color bitmap fonts for use with DPaint or any software that supports ColorFonts.
WB127: Blankers - Over 20 different screen blankers. Most run on Workbench 1.3+...a few require 2.0+
DD92: Developer Contains the official Commodore developers kits for the AmigaGuide and Commodore Install Utilities...a must have for all serious developers.

FUN DISKS

FD6: GAMES! - This disk is chock full of games including; Checkers, Clue, Gold - A new slide the pieces puzzle, Jeopard - An enhanced version of Risk, RushHour - Surprisingly addicting, and SpaceWar - Best described as a cross between Combat-Tanks and asteroids.
FD7: Pacman - This disk contains several pacman type games including; PacMan87, MazeMan and Zonix.
FD10: HackLite - A dungeon adventure game. Considered a must-have classic. This is the 2nd release of this game. Great graphic interface. Play time several weeks!
FD11: Las Vegas and Card Games - Las Vegas Craps - The best Las Vegas Craps simulation every written for any computer. Contains extensive HELP features, Also Thirty-One,VideoPoker and more.
FD12A,FD12B: Star Trek, The Game - This is by far the best Star Trek game ever written for any computer. It features mouse control, good graphics, digitized sound effects and great gameplay. Counts as 2 disks. Req. 1Mb and two drives (or hd).
FD13: Board Games - contains Monopoly, Dominoes, Paranoids, and others.
FD14: Dungeon Master Hints and Arcade Games - DM maps, spells, item location, and hints and more, also on this disk, Hball - an arkanoid/breakout type game, Trix - a Qix type clone.

DD63: IBM - Not one, but *TWO* IBM emulators that will allow the running of MS-DOS software *with* Amiga programs!!! Comes complete with programs to turn your Amiga floppy drives into 720K IBM compatible drives.

FD17: Educational Games - This disk includes several games for youngsters including geography, math, science, and word games, also includes Wheel of Fortune.
FD20: Tactical Games - MechForce; A game that simulates combat between two or more giant robots. Simple words can't begin to give you the feel of piloting a 30 - 40 foot tall, fire breathing, earth shaking colossus that obeys your every whim.
FD27: Arcade Games - This disk is loaded with some great games. Includes, Raceorama a great racing car game with ten different courses, MiniBlast a helicopter gunship type clone, Shark in the same class as frogger, and SBreakout the original breakout with more.
FD31: Games! - Air Traffic Control - a good ATC simulation, Black Jack Lab - a full featured set of card games, ChessTel - play chess with your friend in distant and remote places with this game and a modem, labyrinth - a well done text adventure game (like an infocom game), and MouseTrap - a 3d maze game.
FD32: Flight Simulator - An instrument simulator for a DC10.
FD33: Arcade Games - Ffreddy a Mario Brothers type of game, Gerbils a target practice game, PipeLine a German interpretation of Pipe Dreams, Tron a light cycles version, and Wetroids a wonderful version of asteroids with a hilarious twist.
FD35: Omega (v 1.3) - An outstanding dungeon and outdoors adventure game in a similar vein as hack, rouge, and moria. This version is considerably faster and better that all previous versions. Play time: weeks.
FD38: Games - Cribbage Master - A great cribbage game and tutor, Spades - a well done card came, ChineseCheckers - A computer version of this classic, Puzz - a slide piece puzzle game and construction set.

WB105AB: Workbench 2+ Extras #2

This set contains the programs that should have been included with WB2+. These powerful utilities take full advantage of the many new capabilities that are available in Workbench 2+. Includes: Tool Manager - a wonderful utility to add programs to your TOOL menu, Virus Protection - Degrader, Icon - Enhances Workbench's "Show All" to display over 40 distinct icons for different types of files. Bitmap Font Editor, Screen Blankers - ala fractals and spliners and swarming bees! Requester Enhancers and CPUBlit. Two disk set, counts as two.

FD39A&B: Star Trek, The New Generation - This is a completely different version of Star Trek than that found on FD12. This one was created by the German author Tobias. Excellent!!! Counts as two disks. Requires 512k
FD50: Submarine Game - Sealance, one and a half years in the making, this is an outstanding submarine tactical game. Commercial quality, highly recommended.
FD57: Arcade Games - Includes 2 truly commercial quality games. MegaBall, an Arkanoid-ish game, features 5 musical scores and addicting gameplay. Gravity Attack is a psychadelic trip through several different worlds—each different.
FD59: Game Potpourri - Xenon III is an almost exact clone of the commercial game of the same name...a great shootemup. Crossword will take lists of words & automatically generate word-search puzzles for any Epson compatible printer.
FD60: Games - In Nebula, race over a 3d world to destroy enemy installations. Interferon; a *great* Dr. Mario clone. Enigma; is it a game or puzzle?
FD61: Games - Solitaire; great graphics, plays two versions. Klide; an interesting piece of eye candy. Extreme Violence; 2 player kill or be killed game. YATC; A Tetris clone with Artifical Intelligence. Genesis; create realistic 3d fractal worlds.
FD62: PomPom Gunner. An extremely smooth and well done World War II gunner simulation. Requires 1 megabyte of memory.
FD64: Games - Wizzy's Quest - a "great" 50 level game with great graphics, Cubus - a 3-dimensional Tetris type game (rotate and move in 3 dimensions). Husker Du - Colors and pattern rather than shape in this Tetris-esque game; 5 screens and 3 levels of difficulty. Requires Fat Agnus (1 Meg of Chip)
FD67: Arcade - Includes Llamatron a well-done 'Robotron' clone. Hate is a "terrific" Zaxxon clone with multiple levels/worlds and smooth diagonal scrolling...a 10!
FD69: MindGames - Had enough of shoot-em up games? Relax and let these 21 games exercise your mind instead of your wrist.
FD73: Arcade Series - Intruder Alert! is a MULTI-level "Berserk" clone. Features smooth gameplay, great graphics & digitized sound f/x.
FD74: Arcade Series - RingWar is an "Outer Limits" clone with vectorized graphics. MotherLode is a "Lode Runner" clone with 50 levels! In BlitzTanks, they're coming at you from all directions!! Call in air strikes and use your heavy artillery to survive!
FD75: Arcade Series - Descender is a clone of the classic arcade game "Tempest"; complete with vectorized graphics. Tanx is the classic battle of trajectories and inertia between two tanks—incredibly well done! Search is a maze game unlike any other—included is a level editor too. (Tanx requires 1 meg chip memory=Fat Agnus)
FD77: Arcade Series - Galaga'92 is a clone of the arcade game with several gameplay enhancements--with smooooth, sharp graphics, it's better than the original! Pharaohs Curse is a clone of the original C64 classic. Diplomacy is a beautifully computerized version of the Avalon Hill board game--conquer or be conquered!

THE AMIGAWORLD "BEST-OF" SET!

FD85ABCD: AmigaWorld's Best - These four disks contain the *hottest* p/d games of '92! Includes Mother Lode, Moria, Minefield, Poing, Intruder Alert, Deluxe PacMan, Rocky and Super Artillery (see Dec. '92 AmigaWorld) Four disk set, counts as three.

FD81: SuperGames - Some of *the* best games--Donkey Kong is better than the original *with an extra level!* Frantic Freddie and TrailBlazer are both fast-paced arcade games. Mad Bomber is the classic game of "Kaboom" redone with an Amiga flare. All of these games are excellent!
FD82: Intrepid - In the Arctic ice, you control a tank on a mission to rescue hostages in this superbly crafted Amiga original.
FD84: Games! Deluxe PacMan is better than the original--20+ mazes, special "power-ups" with *oustanding* graphics. ThinkAmania is the classic game of concentration--with *beautifully* drawn HiRes images.

WORKBENCH DISKS

WB4:Telecommunication - This disk contains several excellent pd communication programs: Access 1.42, Comm 1.34 & Handshake 2.12a. See also WB102 & WB115.
WB5: Fonts #1- 35 bitmap fonts. Also included are five PageStream fonts,and ShowFont - a font display program.
WB6: Fonts #2 - ShowFont allows you to quickly and painlessly view all 256 characters in a typical font. Includes large AmigaDos system fonts (many up to 56pts).
WB7: Clip Art - This disk is loaded with black and white clip art. Art includes, trees, watches, tools, US and State maps, and more.
WB9: Icons - Truly a multitude of various types and kinds. Also includes IconMiester, IconLab, and others great utilities to help generate icons.
WB12: Disk Utilities - This great disk is loaded with wonderful utilities for everything including making disk labels, disk cataloging, disk optimizing, disk and file recovery archive and organizing, and all sorts of file manipulation. A must have!
WB13AB: Printer Drivers and Generator - over 70 different drivers (including HP LaserJet 3 & 4!), also includes a printer-driver generator. Two disk set counts as two.
WB15: Business - This disk contains a spreadsheet, a database, a project/time management program and financial analysis (stocks).
WB18: Word/Text Processors - This disk contains the best editors. Includes,TextPlus (v2.2e) a full featured word processor, Dme(v1.35) a great programmers editor with strong macro features,TexED(v2.8) an enhanced Emacs type editor, and a spell checker.
WB22: Fonts #3 - Several more great fonts. These, like the other font disks work great with Dpaint and WYSIWYG word processors.
WB23: Graphics and Plotting - Plot, a 3-D mathematical function plotter. Can plot any user defined function, BezSurf2 - produce awesome pictures of objects one could turn on a lathe. Can also map IFF image files onto any surface that it can draw. Now compatible with most 3D packages, and VScreen - makes a virtual screen anywhere.
WB25:Educational - On this disk are two programs that can generate maps of differing types, World Data Base uses the CIA's data base to generate detailed maps of any entered user global coordinates. Also Paradox a great demonstration of Albert Einstein General Theory of Relativity.
WB27: Nagel - 26 Patrick Nagel pictures of beautiful women.
WB29: Graphics and Sound - This disk has several different Mandelbrot type programs producing stunning graphics. Includes, MandelMountains - a realistic terrain generator, Fracgen - generate recursive fractals from user input, Mandelbrot and Tmandel - two fast mandelbrot generators, also Mostra - the best IFF display program to date. Sound - a great IFF sound player, will play anything.
WB33:Circuit Board Design - several terrific routines for the electronic enthusiast, Including PCBtool - a circuit board design tool, LogicLab - circuit logic tester, and Mcad (1.26) a well done new release of this PD CAD program, now comes with predrawn common circuit components for insertion into schematics.
WB35: 3D Graphics - This disk contains 3Fonts - Full vector font set for use with 3d programs, FontMaker - make 3d fonts from any system font, Make3DShape - create 3d shapes from any image, DumptoIFF - create 3d animations preserves pallet, World3d - a demo of a front end for use with DKBRender.
WB36: Graphics - On this disk are several programs to create stunning graphical images including, MPath - creates swirling galaxy images, Roses - produce an unlimited number of variations of images that a symmetrically similar to a rose, SimGen - display those spectacular images as part of your workbench, and RayShade - a very good raytracing program, create your own beautiful 3d graphic models with this one!
WB37: Educational - Educational games and puzzles that cover math, geography, spelling, and books. Ages 6 - 15
WB38: Plotting and Graphics - Plotxy is a powerful full featured plotting package. Used by many colleges and universities. Highly recommended. Plans - a incredibly well done Computer Aided Drafting program, very full featured. Tesselator - a program that helps generates fantastic looking, recursive M.C. Ecsher type pictures.
WB41: Music - MED an incredibly well done, full featured music editor. Create your own stunning music directly on your the Amiga. Similar to SoundTracker but better. Very powerful easy to use program. Version 3.20--compatible with WB2+.
WB43: Business - This disk contains AnalytiCalc - probably the most powerful spreadsheet program on the Amiga. A full featured spreadsheet with many features expected in a commercial package. Req. 1.2 MB

SPECIAL PRODUCT!

QT1: THE A64 PACKAGE - A very complete Commodore 64 emulator. Supports any CPU and is fully compatible with WB1.3 & 2.0. This version includes a special adaptor that will allow you to connect your 64's 1541 disk drive to your parallel port of your Amiga for total emulation. Two disk set, counts as two. Special price $49.95 - including hardware.

WB46: Clip Art - HighRes clip art with the following motifs - embellishments (borders, dodads ,...), people, & transportation.
WB47: Clip Art - Hires clip art. Motifs - hair, drafting, summer, animals and macfood.
WB48: Clip Art - Hires clip art. Motifs - Holidays, music, medical, and misc.
WB50: Animation - Seven of the best euro-style animations or "Demos", including - scientific 451, subway, sunride, thrstdemo, tnight, waves, and woow.
WB53: Graphics - Raytracing programs generate absolutely stunning realistic looking planes, rockets, buildings...., and surreal images. C-Light is the most powerful EASY-TO-USE of it's kind we have seen to date. This is easily better, and more full featured, than similar commercial programs costing in the hundreds of dollars. Also, sMovie - a full featured video text titler similar to ProVideo, Broadcast Titler. Great video scrolling, wipes, special effects, and more...
WB54: Printing - This disk contains several routines to help with the chore of printing. Includes Gothic - Finally a Banner printer for the PD! PrintStudio -a well implemented all-purpose printer-utility with a very comfortable graphic interface and many advanced features, Lila - with ease, print ASCII files to a PostScript printer, and more.
WB55: Application - XCopyIII - a full featured disk copier, make backups of copy protected disks. RoadRoute - find the quickest route from one city to another, highway description included. Diary - a diary program like "Dougy Houser M.D", Cal - a calendar program, Magman - a database tailored for articles and publications.
WB57: Animation - This disk has several "Demo" style animations, Including, Blitter, Lolly, Sun5, vertigo, vortex, and xenomorph.
WB62: Midi Utilities - Several useful midi utilities including, programs to transfer to and from several music programs to midi, a midi sysex handler, a midi recorder with timebase, display midi info, file sequence player, and a few scores.
WB63: Disk Utilities #3 - Several highly recommended programs to aid in removing duplicate files from your hard drive, performing file backups, Binary editing, fast formatting, file recovery, disk track recovery, and forced disk validation of corrupt disks.
WB66: Icons #2- Lot's of neat icons. Also, several wonderful programs that to let you create your own icons, modify and manipulate icons and info structures.
WB69: Music - 90 minutes of classical and modern electronic music for you Amiga.
WB75: Music - over 100 instruments files (.inst) and sample sound files (.ss)
WB79: Home & Business Accounting - Includes Ckbacct - the most complete checkbook accounting program going. LCDCalc - this well done calculator has a very large display and operates from the keyboard or mouse. Mileage master - monitor your automobile mileage with this mileage log. Grammar - a grammar checker, and Worldtime - find out what time it is in up to 50 global cities.

WB119ABCDE: Font Set This collection contains over 100 typefaces for use with Professional Page/PageSetter 3+ or PageStream 2.1+. These fonts will output to any laser printer or dot-matrix printer with no jaggies, thanks to outline fonts. Very pro-looking. *5 disk set, counts as 4.*

WB81: Great Applications - DataEasy a very easy to use, database program. Don't let the ease of use fool you, this is a very full featured database program including full printer control for address labels and mail merge applications. Also includes, TypeTut a good typing tutor, RLC a full featured label printer, Banner, a multi-font banner maker, and Budget a home accounting in a program. Highly recommended.
WB82: Animations - Four full length, well done "movie" style animations. Including, Coyote, JugglerII, GhostPool, & Mechanix. 2 disks, counts as 1.
WB93: Workbench 1.3 Extras #2 Contains the utilities that Commodore should have shipped with the Amiga; VirusX4.0, Snap, FixDisk (recover corrupt/deleted files), Disk Optimizer (floppy & hard), MachIII (screen blanker, hotkey, mouse accel., macro, clock utility), GOMF (a gurubuster)and PrintStudio.
WB95: Checkbook Accountant 2.1 - Definitely commercial grade; we've seen many checkbook programs and this is the best. Full budgeting, transaction recording & report generation.
WB96: Dupers - Contains XcopyIII & Nib which will backup copy-protected programs. FreeCopy removes copy protection from several programs, and SuperDuper will crank-out fast AmigaDOS copies.
WB99: Lifestyles - Includes AGene—family tree program that tracks up to 600 people/marriages/etc. Landscape is a CAD program to create gardens/landscapes. Loom simulates an 8 harness loom; experiment with pattern design with instant feedback.

Memorex blank disks-3½" DSDD

10 for	$8.00	(.80 cents ea)
25 for	$19.25	(.77 cents ea)
50 for	$36.00	(.72 cents ea)
100 for	$67.00	(.67 cents ea)

Canada/Mexico add $.15 ea., other foreign add $.50 ea.

WB102: Telecommunications - Contains the programs NComm 2.0 and VT100-29B. Zmodem protocols, XPR protocol support, full VT100 emulation. NComm's script language is so powerful it can create a full-featured BBS system.
WB106: Home Manager - This is a great all-in-one address book with an autodialer/notepad/to-do list/appointment scheduler/home inventory database and phone number dialer.
WB108: OctaMED - This breakthrough program doubles your Amiga's sound capabilities from 4 channels to an ear-popping 8 channels! All the renound editing capabilities of MED plus 4 more channels! If you thought your Amiga sounded good before...you aint heard nuthin' yet!
WB109: VerseWise - Display, search and print The New Testament.
WB113: Sid II - Why pay 40 bucks for a directory utility, when this one will do it all plus much more! A truly professional-caliber program. Sid 1 was our best, now *completely* rewritten, Sid 2 will astound you.
WB114: Fonts #4 - Contains 36 bitmap system fonts.
WB115: Telecommunication - If you have AmigaDOS 2.04+ and a modem, then this is *THE* program for you. Term *totally* conforms to the User Interface Style Guide for 2.04, has an ARexx port, and supports all popular file-transfer protocols through XPR libraries. We wish all programs were this good.
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WB118: Amiga Beginner - *You asked for it!* A complete tutorial for the beginner on using the Amiga. Starts you off at the power-switch and takes you through to the CLI/Shell and all points in between. *Bonus!* Also included are 16-color Icons to replace *every* Icon in your 2.0+ Workbench.

WB121: ProPage3 Enhancer - This disk contains over 40 "Genies" for use with ProPage 3.0, including useful ones like Make Pie Chart and Resize Text to fit Box to name a few. Also includes structured & bitmap clipart for unique borders...a *must have* for all PPage 3 users.
WB122: System Optimizer - KCommodity enhances your system, gives memory meters, mouse/keyboard enhancements, online timers plus *many* others...too numerous to list! REorg will optimize hard and floppy-disks for a big speed increase. HDMem will allow you to use up to 2 megs of hard-drive space for virtual memory! (Req. 68020+ w/MMU) All programs require 2.0+.
WB123AB: Flags of the World - same as WB124, but for Workbench 1.3. Req. 1MB. 2 disk set, counts as two.
WB124: Flags of the World - Two modes: click and learn or a game to test your knowledge. Great graphics--fantastic learning tool. Has current Russia & Yugoslavia republics. Req. Workbench 2.0+ & 1MB RAM.

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DD54: Compression - This disk is loaded with all of the best file compression programs and aids for the Amiga. Many of the programs can be used by the new user. Includes Arc, Lharc, Lhwarp, Pkax, PowerPacker a must have by all, Zip, Warp, and Zoo.
DD71AB: C Compiler - This disk contains DICE, Matthew Dillon's full featured, powerful C compiler & environment. 2 disks, counts as 2.
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VIDEO DISKS

VO5: Modeling - This demo, Vertex, allows you to create 3-D objects without using the abstract X, Y and Z views. Loads Sculpt-3D/4D, Turbo Silver, Imagine, LightWave, GEO and Wavefront formats. MagicTween will metamorphasize any two pics and animate the "in-between" frames.

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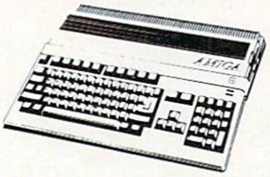
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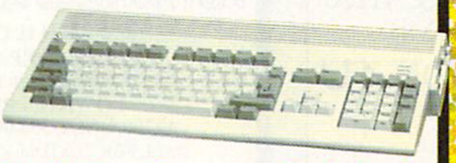
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THE LAST WORD

Kudos, complaints, comments, concerns, and contributions from our readers.

PD Priority

Given that Amiga game development, and its consequent print coverage, is on the wane, why not expand shareware and public domain coverage to a full multi page column? Amiga PD and shareware development remains lively despite the erosion of the commercial market. PD and shareware reflect a multitude of interests, as it is created by users to fill a need not addressed by commercial programs. There are literally hundreds of games, analysis programs, and utilities available in this format, and no magazine covers them extensively.

Jeffrey T. Powell
West Covina, California

Good idea—Look for expanded coverage of the PD/Shareware market beginning with the Nov. issue.—Eds.

Classroom Column

The very attributes that make the Amiga so well suited for video and multimedia use (its multitasking operating system, its graphics capabilities, its speed of operation, and so forth) also make it an ideal platform for scientific, mathematical, and engineering work. Here at the College of Saint Rose, we have a classroom with 21 Amigas (20 A3000s and one A3000T). The A3000T is connected to a 1960 monitor and to two 26-inch Mitsubishi Stepscan TV/monitors mounted overhead in full view of the classroom. This classroom is dedicated to the mathematics department and almost all of our courses are taught in this facility. It doesn't stop there; the physics lab has about a dozen Amigas, a mix of A500s and A2000s, which are also used for teaching. I don't think that we are an isolated case; I think there are more schools using Amigas for instruction other than in video or graphics labs.

I think that *AmigaWorld* should consider adding a new department that presents the scientific, mathematical, and educational uses of the Amiga and related software to inspire other schools to consider the Amiga for their academic programs.

Carmen Q. Artino
Albany, New York

Trademark Taboo

In the article "Claymation Excitation" by Gene Hamm (Dec. '92, p. 39) "claymation" was incorrectly used throughout as a generic term for clay animation. Claymation applies only to works that are produced by Will Vinton Productions. The only proper use of the trademark is as an adjective describing the animation process of Will Vinton Productions. Clay animation produced by others should be referred to by means of the appropriate generic term, clay animation.

> *The very attributes that make the Amiga so well suited for video use make it an ideal platform for scientific work.*

Tom Bozigar
Will Vinton Studios

We regret the error and apologize for misusing the trademark. We are committed to providing accurate information to our readers; therefore, in the future we will use the appropriate term.—Eds.

Accent on Business

I recently moved my business records and databases from a PC to an Amiga. I hadn't paid much attention to Amiga business programs so I started going through two years' worth of *AmigaWorld*. I didn't find much in any of them that was very useful. The couple of reviews on databases and spreadsheets appeared to be written by people who didn't use them on a regular basis.

I know that people do not buy Amigas primarily to do their office work with, but there are programs for the Amiga that perform all these tasks, so why not exploit them? I just wish *AmigaWorld* had a monthly column on the Amiga office written by someone who uses the software in real situations. Such a column should cover the Amiga business programs on a regular basis offering tutorials and solutions for office problems much like Joel Hagen's "Accent on Graphics."

Richard Gaikowski
San Francisco, California

Networking Contact

I feel that the entire world of telecommunications is very much ignored by *AmigaWorld*. Just because you know how to use a terminal program does not mean that you know how to use a BBS. Articles about getting on-line that give an overview about the BBS software and network interface would be most welcome. Perhaps an article about different networks is in order as well as an article about what file compression is and what utility programs are available to aid in downloading and decompressing files.

Greg Bastan
White Rock, Canada

Amiga Aesthete

Thanks for bringing back to *AW* an area where Amiga users can stare in awe of fellow users' masterpieces (see Digital Canvas, Jul. '93, p. 28).

Dave Porter
Dayton, Ohio ■

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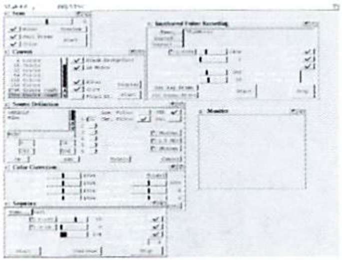
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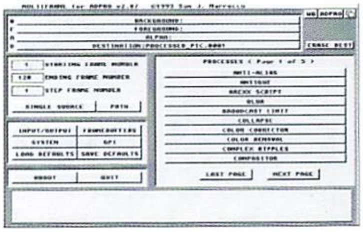
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- Real time Color, Contrast, Luminance and Gamma, Luminance, Chromanace controls.
- **AGA chip set support.**
- **Includes ADPro Loader module.**
- Extensive ARexx control system.
- Save images in 24Bit, YUV, or AGA.
- The VLab™ is supported by many popular Graphics programs.
- Supported by the Nucleas Personal SFC.
- The VLab™ requires Kickstart 2.0.

MultiFrame - ADPro

According to Matt Drabick, of AVideo magazine "MultiFrame is a must for Amiga video users who always wanted to apply special effects to their animations using ADPro and MorphPlus but never had the time to learn how to write and execute ARexx scripts."



MultiFrame is a front end for the Art Department Professional and Morph Plus that gives you much greater control over multiple-frame processing with no knowledge of ARexx required. You can manipulate single or multiple images over time creating special effects easily. **The perfect tool for creating effects with a large number of images for output to video.**

MultiFrame Features:

- **Process images over time** - most processes can be manipulated with a starting value and an ending value with the separation being the number of frames that you choose to make. **Generates all frames automatically for you.**
- **Non-linear motion** using true splines with adjustable knots, tension, continuity and bias. Full spline- controlled variables.
- **Perform ADO-style fly-ins** of moving images easily using perspective operator. Create panning/tilting camera effects on still images or sequences.
- **Multiple frame/Multiple Ripples,** allowing ripples that start on different frames that accelerate/decelerate over time.
- **Rotoscope:** Automatic compositing of foreground images over backgrounds using true alpha-channel/holecutter/key effects.
- Automatic scaling and conversion of images during processing.
- Auto-Display of images to supported framebuffers (Retina, Firecracker, OpalVision, Harlequin, DCTV).
- Complex operator/processes (sphere, perspective, etc...) now allow loading and saving of all parameters for easy recall.
- **Automatic conversion** of any supported image format to any other format (including ANIM-5/ ANIM-8 and **Toaster FRAMESTORE**) during processing.

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